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STATE OF TENNESSEE

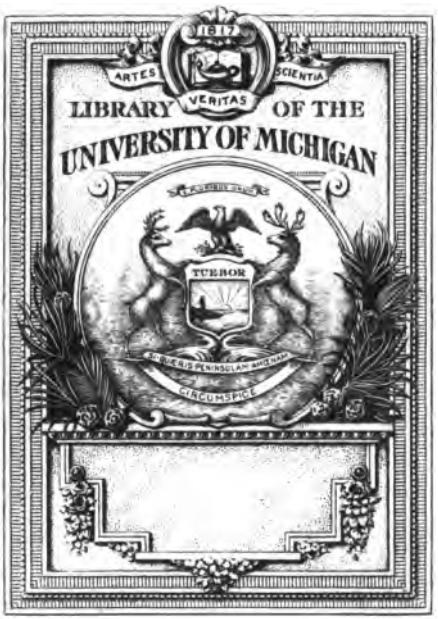
REPORT OF

GEO. E. SYLVESTER

CHIEF MINE INSPECTOR

1911

NASHVILLE



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STATE OF TENNESSEE

TWENTY-FIRST ANNUAL REPORT

OF THE

Mining Department

COMPLIMENTS OF THE

MINING DEPARTMENT OF TENNESSEE

The annual report edition of the Mining Department being limited, the names of those failing to acknowledge receipt of the book will be stricken from the mailing list. Editors of periodicals will please forward copy of issues containing notice of review.

Nashville
Williams Printing Co.
1912

STATE OF TENNESSEE

TWENTY-FIRST ANNUAL REPORT

OF THE

Mining Department

GEO. E. SYLVESTER
CHIEF MINE INSPECTOR
NASHVILLE, TENN.

MINERAL RESOURCES OF TENNESSEE

1911

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OFFICE OF CHIEF MINE INSPECTOR.

NASHVILLE, TENN., November 22, 1912.

To His Excellency, Hon. B. W. Hooper, Governor of Tennessee:

DEAR SIR: I herewith submit to you the Twenty-First Annual Report of this Department, embracing the mineral resources of Tennessee for the year 1911.

Very respectfully,

GEO E. SYLVESTER,
Chief Mine Inspector.

INTRODUCTION

The report of the Mining Department is designed to cover, not only the statistics and information relative to the various mines, but also to give data and statistics of all mineral operations in the State.

While it has been the intention that the general form of this report shall follow as near as possible that of preceding reports, especially as to the tabulated statistics, it has been thought best to deviate slightly in some instances where it would seem to make the information more comprehensive or more readily available.

The first part of the report has been devoted exclusively to coal, other mining interests, together with that of the various mineral products, being considered in the latter part of the report.

On June the first of this year there was an entire change in the personnel of this department, Mr. R. A. Shiflett, who had held the position of Chief Mine Inspector for twelve years, completing his term and retiring, together with the other members of the department. The present personnel of the department being:

GEO. E. SYLVESTER, *Chief Mine Inspector,*
JOHN ROSE, *District Mine Inspector,*
JOSEPH RICHARDS, *District Mine Inspector,*
W. A. OVERALL, *Statistician,*
WM. YORK, *Clerk,*
H. B. JACKSON, *Stenographer.*

ACKNOWLEDGMENTS.

The larger part of this report, depends upon the exact and complete information returned by the operators of the various mineral industries of the State, hence a hearty and prompt co-operation on their part with the department, is essential. We wish to acknowledge the willingness and the promptness with which in nearly every instance the operators have responded to this call. The necessity of having these returns practically complete before the work of compiling can be begun, is apparent. I would therefore urge that this point be borne in mind in the future that the delay in getting out reports hereafter may be shortened as much as possible.

Where information has been derived from other sources, it has been the aim of this department to give special credit in each case. In some of the general statistics, however, this would be impractical. Credit should be given to the various Federal reports and other sources of information which have been thus drawn upon.

Acknowledgments are also due the State Geological Survey for information furnished, and for the hearty co-operation which we have always had from this de-

partment. I also wish here to express my appreciation of the faithful and efficient work in the field of District Inspectors Rose and Richards, and for their assistance in furnishing data for this report; also to the office force of the department on whom the detail of this report mainly rested.

As in the previous reports, information and tables relative to the production of coal is the predominant feature of this report. This is so, for the reason that not only does coal form the most important part of our mining industry, but the coal mine in the very nature of things necessitates more careful attention on the part of the inspector. The first part of the report is given to coal exclusively. The second part is devoted to the other mineral industries of the State. The metal mines, aside from surface workings, consist principally of one group, with a few scattering iron mines, and the copper mines in the Ducktown district. This development will probably be increased in another year by more extensive operations in the zinc field. These mines, together with the other mineral industries will be considered in the proper place.

COAL

The amount of coal produced in the State of Tennessee in 1911 was 6,466,224 tons, valued at $7,071,376. This was a decrease of 442,464 tons under that of 1910, or 6.8 per cent. This decrease was not uniform however; seven of the counties, namely, Campbell, Fentress, Hamilton, Rhea, Scott and Sequatchie showing slight increase over the year 1910. This decrease in 1911 is not alone confined to Tennessee; a number of the other coal producing states show a like decrease in production, and the output of the United States as a whole falls below that of the year before. This may be accounted for, in part at least, by the general depression in the early part of the year.

The amount of coal in this State mined by machine is not large, amounting to less than 17 per cent of the total product, and the decrease of machine-mined coal was about in the same ratio as the general decrease for this year, although the number of machines reported shows a slight increase.

The larger part of the coal produced is either hand pick mined, or shot on the solid.

While the coal is almost universally mined on the room and pillar plan, there is considerable variation in the mines in regard to details, and in some instances the panel system is being used. No systematic attempt at long wall is being made.

In spite of the fact that there was a decline in the output of this year, there was $417,102 reported expended in development during the year.

LABOR.

While a number of mines were idle, or running short time, especially the first of the year, no labor troubles of any moment have occurred.

NEW MINES.

During the year there were 16 new mines added to the list. They are included in the general list and are as follows:

NAME.	*OPERATOR.*	*COUNTY.*
Drum Opening	New Etna Coal Co.	Marion
Mill Creek	New Etna Coal Co.	Marion
New Etna 3	New Etna Coal Co.	Marion
New Etna 6	New Etna Coal Co.	Marion
Hooper	Bottomlee & Fagan	Morgan
Jackson	R. H. Jackson	Morgan
Glen Mary 3C	Glen Mary Coal & Coke Co.	Scott
Stanley 2	Stanley Coal Co.	Scott
Rosser	Virginia Mining Co.	Scott
Perkins Branch	Perkins Branch Blue Gem Coal Co.	Campbell
New Royal	Royal Coal & Coke Co.	Campbell
Pee Wee	Sun Coal Co.	Campbell
White Oak	Westbourne Coal Co.	Campbell
Newcomb B. G.	T. L. Wilson	Campbell
Italian B. G.	Peter Zechini	Campbell
Fork Ridge 4	Fork Ridge Coal & Coke Co.	Claiborne

There were a number of mines dropped from the list shown in the last report. Of these, 18 were worked out and abandoned, or shut down indefinitely. The larger part, however, were mines which were working as separate openings, and are now known and operated as one mine, or mines where the name has been changed. A list of these mines is given under the general list.

The general conditions of the mines are, on the whole, good; but in some instances the use of powder is somewhat excessive. Permissible explosives are beginning to be introduced. In some, especially among the smaller mines, the ventilation is not what it should be. This condition is, however, being rapidly improved. The department is pleased with the general disposition on the part of the operators and mine officials to co-operate with them in their efforts for greater safety and better mining conditions; in few cases has there been any disposition to avoid or not comply promptly with any of the necessary regulations of the department.

A number of the mines have been changed to a higher classification, and more rigid restriction has been put upon them. In a few cases which seemed to warrant it, the classification has been lowered.

DEATH RATE AND ACCIDENTS.

The unfortunate and deplorable disaster at Briceville, on December 9th, in which 84 lives were lost, brings the death rate of this year abnormally high. Deducting this number from the total of 111 leaves 27. This number, in comparison with previous years, shows the lowest death rate from the ordinary mine accidents since 1903.

BRICEVILLE DISASTER.

The special report on the explosion of the Cross Mountain mine at Briceville was made shortly after the disaster, and is as follows:

To His Excellency, Hon. Ben W. Hooper, Governor of Tennessee:

DEAR SIR: I hereby beg to submit the following report of the explosion of the Cross Mountain Mine:

At 7:20 on the morning of Saturday, December 9th, 1911, an explosion occurred in the Knoxville Iron Company's Cross Mountain Mine No. 1, at Briceville, as a result of which eighty-four miners lost their lives.

Having just arrived at Rockwood that morning, I did not learn of the disaster until between nine and ten o'clock, and as it was then too late to get to Briceville by train, I immediately arranged for transportation by automobile. I arrived at Briceville between three and four o'clock in the afternoon, bringing with me Mr. W. T. Richards, Mine Foreman of the Rockwood mine, and two of the Roane Iron Company's Oxygen helmets. Before leaving I notified District Inspector Rose to report at Briceville as soon as possible. He reached the mine the next morning. District Inspector Richards, who had received word at an early hour Saturday, arrived about noon on that day.

The Cross Mountain mine is a drift mine, situated at Briceville, Tennessee, five miles from Coal Creek, the nearest railroad station. The mine, which has been operated for many years, is quite extensive, covering, including the worked-out section, probably over 500 acres. Of this something over half could be included in what we might consider active operations.

The main entry, running in a northwesterly direction, is 8,400 feet long, having an air course on the right. The first rooms on the left are driven narrow and holed through to the air course above, this serving as an air course on the left side.

The cross entries, of which the lowest is No. 26 on the left, and No. 27 on the

right, average, except in the lower part of the mine, about 2,500 feet in length, the longest being about 3,000 feet. These entries are driven as gob entries, the gob being carried on the upper or outbye side from which the rooms are turned, the air course being carried on the lower or inbye side.

The brattices on the main entry were mostly of brick, while on the cross entries the stoppings were usually of slate and waste material made 10 or 12 feet thick and packed tight.

The ventilation was by two splits, the return on the left passing through an overcast on the main 3,700 feet in. At 3,000 feet from the entrance, and to the right, was an air shaft about 100 feet deep, at the bottom of which was an electrically driven disc fan 7 feet in diameter. This fan was driven as an exhaust fan delivering the return air up the shaft. It furnished, according to the latest reports, an average of 35,000 feet per minute.

The average number of men employed in the mine, as given by he last two monthly reports, was one hundred and twenty-five. The amount of air furnished would thus be nearly double the legal requirement for this class of mine (B), and a surplus over the requirement of a class "A" mine.

The brattices were in good shape and well maintained. The ventilating current entered the mine and traveled as far as the air shaft on both the main entry and its air course on the right. From here on it traveled the main entry only. At 25 Left, the air was split, 26 Left being put on the right-hand split in order to equalize resistance. The air in each case traveled up the air course to the face of the cross entry, returning on the entry. As it was customary to hole through every third and fourth room as soon as worked up, the air did not have to travel back to the main, but a large part of the circulation was kept through the workings near the faces of these cross entries, that on the left crossing the overcast to the airway on the right. As the mine was not known to generate gas, this system seemed to give good results, all working places getting sufficient air.

The coal was undercut by electrically driven chain machines, and shot down by black powder, except in that part of the mine which was drawing back, where little or no powder was used, the coal being mined with the pick.

On my arrival at the mine I found District Inspector Richards, Supt. P. F. Lynch, Mine Foreman George Bullmer, with a volunteer force, engaged in restoring ventilation by replacing the brattices on the main entry that had been blown out by the explosion. The air which had been short circuited by the blowing out of the brattices had formed a natural ventilation from the mouth of the mine to the air shaft, and Messrs. Lynch and Bullmer had succeeded in reaching this point within half an hour after the explosion, finding that the fan had been damaged and put out of commission by the explosion.

The plan of restoring the ventilation which had been decided on, was to take the air directly down the main entry, bratticing every opening and restoring the overcast This plan I approved for a number of reasons: The location of the men in the mine who would for the most part have had time to reach their working places, would be scattered over nearly all the entries from 17 or 18 down. Thus we wished to reach the lower part of the mine as soon as possible. With the amount of air current available, to have attempted to split the air, working a party on each split, would have been very dangerous for the rescue parties, as any variation of resistance in the air might have allowed the after-damp to have been driven back on the rescue party. Another point considered was that in carrying the air down the main entry, the return on each side would gradually dilute and carry away the heavy body of afterdamp lying along this entry, without forcing it to any extent up the cross

entries. If any of these cross entries had been unaffected by the explosion near the face, to have immediately restored ventilation in them would naturally have carried enough afterdamp ahead of the ventilating current to have proved fatal to any one barricaded there. This natural ventilation, which was increased by a fire built on mine rails laid over the top of the shaft, gave sufficient air so that the advancing of the brattice work could be carried on. Meanwhile a disc fan belonging to the Black Diamond mine had been procured and brought to the mine. This was set up Saturday night, and about two o'clock Sunday morning was put in operation. This fan was located at the old drift near the entrance and connected with the main entry. It was run as a force fan and doors used at the mouth of the entry. The result was a decided increase in the amount of air, with no change in the direction of the ventilating current. As soon as this fan was started the fire was removed from the air shaft.

On the right there had been some connections, through old workings, with the Thistle mine, which were kept bratticed. To help clear the mine, in case these stoppings were out, the Thistle fan was kept running as exhaust. It is not probable, however, that this affected the ventilation to any great extent, as it was afterwards found that the force of the explosion did not reach this part of the mine.

The United States Bureau of Mines was early represented, Mr. Sutton, who was in charge of the Knoxville Station, arriving with oxygen helmets from the Station on the special train chartered by Mr. Stephenson, President of the Company. This train, which also brought District Inspector Richards and others, arrived about noon Saturday. At 5:30 on Saturday night, Mine Rescue Car No. 7, in charge of William Burk, arrived, and at 4:00 p. m. on Monday Mine Rescue Car No. 6. Dr. J. A. Holmes, Director of the Bureau, and a number of others of this Department were also on hand as soon as possible. Dr. Holmes, who took charge of this Department, sent for and obtained volunteers trained in the use of the helmets, from both Kentucky and Alabama. The only men from this State, trained in the use of the apparatus, were W. T. and J. M. Richards from Rockwood, who were using the Roane Iron Company's helmets, and who did efficient work.

On account of the limitations of the apparatus, and the fact that those trained in the use of them were not familiar with the mine, little work of exploring the cross entries could be done until after they were reached with the air on the main entry. Several entries, including 18 Left, were explored a short distance on Saturday night, but the afterdamp and smoke were so thick that the helmet men, unacquainted with the details of the mine, were unable to see their way. As the ventilation was carried farther down, many of the cross entries were explored by the helmet men, some to the face, and others only part of the way.

Although none of the lives saved could be credited to the use of the helmets, yet the work done in exploring the entries showed the great possibilities of this apparatus. There is no doubt that some of the small fires discovered and put out by the helmet men, would have become very serious, and possibly have gotten beyond control, if they had been left until ventilation had been sufficiently established to have reached them without the helmets; and there is also no doubt but that if there had been sufficient local men, who were acquainted with the mine, trained to the use of the apparatus, more expeditious work could have been done.

On Monday night, about 6:00 o'clock, three men were taken from the mine alive, having found their way to the brattices on 18 Left, the afterdamp by this time having become sufficiently diluted to allow them to reach this point. They report two men alive at a barricade which they had left on the haulway at 17 Left, and these were soon taken out by the rescue force. The rescued men also reported that two

members of their party had left them some time before and started to find their way through 16 Left and the entries higher up. The bodies of these men were found some days later, after a long search on 16 Left, where they must have been overcome by the afterdamp a short time after leaving the barricade.

Bodies of the men were taken out as fast as possible, those on the main entry as fast as they were reached, and those on the cross entries as soon as these could be explored. At first it was necessary to build brattices to get into these cross entries as the stoppings were in almost every case blown out, but later they had cleared sufficiently so that some of these entries could be explored without entirely restoring the ventilation. No indication of gas was found by the rescue force, or those recovering the bodies, except some slight indications found by the helmet men in the head of the main entry, and these indications might have been, and probably were, caused largely by the carbon monoxide and other gases generated by the explosion, rather than by the methane liberated from the coal.

As the number of safety lamps first available was insufficient, and the air current good, naked lamps were at first used by the brattice crew, but as soon as possible those in advance were put on the safety lamp entirely, naked lamps being only used back on the main entry on the intake air current.

During the progress of the exploration work a number of fires were discovered, one on 17 and one on 18 Left, the former giving some little trouble to put out. Several small fires were found and put out on 16 Right by the helmet men. A fire, only a short distance from the main, in a cross cut on 17 Right, however, had gotten beyond control, and in order to get the two bodies that were found on this entry beyond the fire, it was necessary to bring them down through one of the rooms which had been cut through to a lower entry. These bodies were the last to be recovered, being taken out on the 19th.

The condition and location of the bodies found shows that the greater part of them must have been killed at once by the explosion, or immediately after by the gases from same. Several found beyond the limits of the explosion on the right, however, probably lived for some time, and were killed by the afterdamp. Of this number, two were found in a "tool house" at the side track on 17 Right, one of whom had left a message to his people, showing that they must have lived for some time. As this point on the side track was only a few hundred feet beyond where the force of the explosion was shown, it is not probable that the afterdamp could have been very long in reaching them. No attempt at barricading against the afterdamp was found here. A number of others on this side of the mine were found in positions indicating that they had either attempted to make their way out directly or through an upper entry and were overcome by the afterdamp. The condition in which the bodies were found would indicate that a number of these men may have lived for some time after the explosion.

On December 19th I started an investigation of the mine, and reached as far as 23 Left on the main entry. The fire on 17 Right not being under control, and as it would have been impossible to explore the lower entries without cutting the air off from those fighting the fire. I decided to postpone further investigation until later, it being January 3rd before the fire was sufficiently under control to warrant again taking up the work of exploring the mine.

In the party making the examination were: Geo. E. Sylvester, Chief Mine Inspector; John Rose, District Mine Inspector; Joseph Richards, District Mine Inspector; Dr. J. J. Rutledge, U. S. Bureau of Mines; William Burk, U. S. Bureau of Mines; E. B. Sutton, U. S. Bureau of Mines; T. P. Wangler, Insurance Inspector; P. F. Lynch, Supenintendent Cross Mountain Mine; E. F. Buffat, Superintendent

Tennessee Mine; W. H. Stores, Representing Property Owner; Jno. M. Wood, Miner; Will Stonecypher, Miner.

There were several others representing both the Company and the miners who were with the party at different times during the investigation, it being my desire that any one interested, including the miners of the district, should have an opportunity of being present at this investigation.

All of that part of the mine which was covered by the explosion was carefully gone over, and everything noted which would indicate the force, direction and extent of the explosion, the amount of heat shown, or coke found, location and position of the bodies, and in fact every detail which might throw light on the cause and point of origin of the explosion.

Without going into details as to conditions on each particular entry, the evidence shows that the larger part of the lower half of the mine was covered by the explosion, the territory included being roughly estimated at over one hundred acres, and the entry and air course affected for some ten miles.

On the main entry the first indications began to be manifest a few hundred feet in, as shown by deposits of dust, rocks blown into props, and timbers dislodged. No marked indications of heat, however, were apparent until after the air shaft was passed, and the first well marked coked road dust was found at the side track.

On the left the explosion was most violent, and all the lower entries up to 22 Left showed that the explosion had traveled with extreme violence to the faces. Above 22 Left and as far as 17 or 18 Left, the explosion only traveled up these entries a short distance from the main. On the right the explosion was less extensive; only in a few of the lower entries did it carry to the face. The explosion, however, carried into all of these entries from the main, up to 15 or 16 Right. While evidence of extreme force was manifest on some of these lower entries, it was not as general as on the left.

On the main entry the indications showed that the direction of the explosion was towards the outside, and most of the brattices which were on the right were blown towards the air course; in the vicinity of 25 and 26 Left, however, it was difficult to tell the direction. The stoppings on both the right and left cross entries were in almost every case blown from the air course to the entry, and as many of these stoppings were of slate 10 or 12 feet thick and packed solid, great force must have been exerted. There were few falls found on these cross entries, but the immense amount of slate blown into them from the cross holes made them difficult to travel. The ventilation being only partly restored, there was very little air traveling these entries and careful tests were made for gas in all places where there seemed any possibility of finding traces. No indications that showed with any degree of certainty on the Wolf lamp were found, however, except in room 21 on 25 Left. Here a short distance up a fall had occurred, and up in the fall a decided cap was obtained on the Wolf lamp. Tests made on subsequent visits to this fall with a Peeler lamp showed a 2% mixture, and it is probable that in places on the fall a higher per cent. could have been obtained. No gas could be detected, however, in the room or entry. An empty car was found just outside of the fall, also the tools of the miner, although his working place was at the face of the room beyond the fall. The body of the man working here was found face downward just inside the room. Some gas could be detected in this fall in small quantities for several months after the explosion, and until a small current of air was turned through same by a temporary brattice on the entry. Samples taken from this air, which showed 1,500 feet per minute, gave only 0.2 per cent. of methane,—not an unusual amount to be found in a normal mine.

While no gas could be found elsewhere in the mine, the flatness and evenness of the roof was such that it gave little opportunity for gas to collect, and there might have been a small amount present diffused in the air, but not enough to be shown on an ordinary safety lamp. This seam has never been known to make any gas, but another small seam located 15 or 20 feet above this was probably the origin of that found in the fall.

A very careful search was made by all the party making the investigation, to see if any evidence of a windy or blown out shot could be found, but nothing which could have been considered conclusive evidence of one was reported.

On entry 26 Left in room No. 2, the coal was undercut ready for shooting, and a hole four feet deep near top and right rib was found. In the neck of room No. 4 four bodies were found, they being the only men working on this entry. They were quite badly burned and were lying together in the room neck. These men were known to have gone in early that day to shoot for the day's run, there being no fixed hours for shooting in this mine.

If this hole had been shot and had blown out, it would have been considered evidence that this was the seat of the explosion, as the position in which the men were found was one which they would naturally have taken when awaiting for a shot. The hole, however, was one that would have easily broken with a moderate charge of powder, and no powder stain could be found around the hole.

Before summing up any conclusion, it might be well to note certain facts in regard to the mine.

The mine was classified as a "B" mine, and was known to be naturally dry, but was considered as non-gaseous.

In the regular monthly reports sent in by all mines, there is a question in regard to "gas indications." These reports were sent in regularly by Cross Mountain Mine, and in looking up the same for the past year, I find that the question "Gas Indications" is answered in all cases by "None."

This mine had been inspected on August 3rd and October 30th, 1911, by District Inspector Richards, the reports showing that normal conditions existed.

Water boxes, or tank cars were used in sprinkling the mine. These were attached to the trip, the water being allowed to run out on the track. This system dampened the roadway only, and while it may have kept this reasonably moist, where used, it could have had but little effect on the dust on the sides and gob, or in the rooms and air courses. During the investigation, a number of weeks after the explosion, moisture was observed in a number of places in the roadway of the cross entries.

It is evident, however, that this system was not sufficient to keep a mine of this size sufficiently moist, especially after a prolonged spell of cold weather.

While there must have been a great amount of dust in the mine, as shown by its condition after the explosion, it is reasonable to suppose that more or less of this dust was driven from the gobs and other concealed places by the force of the explosion.

The cars in use were low with no end gate except an iron rod, and in order to carry the required capacity, had to be loaded above the level of the top.

In hauling these cars at a rapid rate with a motor, there was naturally considerable coal lost along the entries. This slack or fine coal, with its certain per cent. of finer dust, constantly settling on gob and rib, undoubtedly was a factor in the explosion, as also must have been the deposit of fine dust produced by the mining machines.

The location of the fan inside the mine, where it could be destroyed or disabled

by an explosion, was known to be contrary to good mining practice. It had, however, been placed there in order to use the air shaft as part of the ventilating system, the position on top of the shaft being too inaccessible. The regulations in regard to fan construction in the mining code apply only to class "A" mines.

This question of fan location would have proved very serious in delaying the rescue work, if it had not been that another fan had been so quickly available. As it is well known that the air current, either direct or exhaust, tends to follow the shortest, or lines of least resistance, I do not consider that there would have been much, if any, advantage in an exhaust system, and if a cramp or stoppage had occurred in the airway ahead of the rescue forces, I should consider the direct current offered less danger to those engaged in restoring ventilation than the exhaust.

CONCLUSIONS.

Judging from all information at hand, and after a careful investigation of all parts of the mine covered by the explosion, I consider the same mainly, if not wholly, a dust explosion. There may have been a small amount of gas present in the air which rendered the dust more sensitive, causing it to propagate more readily. This possibility would be given more weight by the fact that the door on entry 22 Left was found propped open by the rescue party. If this door had been left open all night, it would have short circuited the air from everything below, especially on the left. While there is no manner of telling to what extent, if at all, this question of a gas laden air affected the explosion, I think it may be taken as an established fact that the explosion cannot be accounted for on the grounds of gas alone.

There are a number of points where the explosion differed in detail from many other dust explosions—among them being the small amount of coke found, the absence of any indication of heat or flame in many places, and the fact that the explosion died out on many entries before reaching the headings; also that it did not reach the outside. Although there was much dust present, a great deal of this was evidently so mixed with shale dust as to be wholly or partially inert. It was probably the smothering or blanketing effect of this more or less inert dust which had much to do with the dying out of the explosion on so many entries.

The fact that the explosion was so much more violent on the air courses, blowing the heavy stoppings in almost every case from the air course to the entry, may be accounted for in some degree by the fact that the air course was on the intake air, and the explosion starting in the lower part of the mine, traveled in a general direction towards the outside. I should consider the greater reason, however, was that the air courses were much dryer than the entries, the latter having been kept more or less damp on the track, also that the explosion in the entries had a chance to spread in the large area left open by the rooms, while once propagated on the air courses it was so closely confined that it would increase in violence, and could only exert its force by blowing out the stoppings to the entries.

I do not feel that I have enough data to be able to decide with any degree of certainty, the exact point from which the explosion started, or its initial cause. From the general evidence found, however, I have concluded that it started somewhere on entries 25 or 26 Left, propagating in the lower part of the mine from one entry to the other, largely through the holed through rooms, but also by the main entry, over which it crossed to the right side of the mine.

As to the initial cause, I can only mention some of the possibilities, as there seems to be no evidence which we can consider as direct. It is quite probable that the fall found in room No. 21 on 25 Left, occurred during the night before the ex-

plosion, and that it extended up into the seam above. That a slight gas explosion could have occurred at this point, being ignited by the lamp of the miner working this place, and propagating the dust on the entry at the neck of the room, is by no means improbable. There is, of course, also the possibility that there was a windy or blown out shot, evidence of which was not discovered; there can also be some question in connection with the condition found in room No. 2 on 26 Left. Another possibility would be the accidental explosion of a cartridge, jack or other small quantity of powder, which might have occurred leaving no evidence.

I do not wish to conclude this report without commenting on, and heartily commending, the efficient work done by the hundreds of miners throughout the district who volunteered their services in the rescue work. With the system employed, of checking every man who entered or left the mine during the rescue work, I have been able, through the thoughtfulness of District Inspector Richards, to obtain a complete list of every man assisting in the rescue work, and this list will be kept as a part of the permanent records of the Mining Department.

I also wish to speak of my appreciation of the faithful and untiring work of my District Inspectors, John Rose and Joseph Richards, and also the efficient services rendered by the neighboring mine officials.

The prompt response of the Bureau of Mines, and the readiness with which Dr. Holmes brought to our aid every resource of his Department, is also highly appreciated.

Respectfully submitted,

GEO. E. SYLVESTER,
Chief Mine Inspector.

April 5th, 1912.

The opening up of a mine after an explosion and the re-establishing of ventilation is a difficult and dangerous work, and great care is necessary that no additional lives be lost. That this was successfully accomplished, in the case of the Cross Mountain Mine is due, at least in part, to the way in which the miners, not only from the nearby mines, but, to quite an extent, from the whole mining field, volunteered their services in this work, and to the efficient manner in which the work was carried out. While it would be an injustice to comment on any special act, I feel that the department owes it to these men to put on record a list of their names. In this list, which was compiled from the list used in checking men in and out of the mine while the work of reopening was in progress, no distinction is made between miner, superintendent, or operator, it being as far as possible a complete list of those who took part in the recovery work.

Special credit is due to a large number of these men who made unusual and heroic sacrifice both in time and effort in this work of opening up the mine and the recovery of the bodies of the victims.

LIST OF THOSE TAKING PART IN THE RESCUE WORK IN THE CROSS MOUNTAIN MINE AFTER EXPLOSION OF DECEMBER 9, 1911.

James Atkins	Geo. Bulmer	Ike Bales	J. K. Bailey
C. J. Asebell	Joe Baily	Hull Brown	Noah Braden
John Allen	—. Brandt	Robt. Barnes	Wm. Brashers
James Andrews	Chas. Brooks	J. G. Bulmer	E. F. Buffat
Wes Alexander	Robt. T. Boone	James Burrows	H. H. Braden
Oscar Atkins	J. W. Butler	Ballard Burns	John Boyd
Charles Andrews	Hopkin Bevan	Sam Brooks	Geo. Burnett
Jake Angel	Rufe Beets	Geo. Buch	Geo. Blankenham

U. Brandt
Jas. Brown
Francis Brawley
Thos. Bretcher
Chas. Bell
John Braden
Wm. Branscomb
Wm. Burke
A. R. Brown
Jas. Brown
Dr. E. M. Beasley

Henry Carter
Geo. Cox
Chas. Craig
G. B. Carden
C. F. Carnes
R. J. Carnes
C. G. Carnes
Jed Chittum
Jas. Cosper
Geo. Cunnett
Joe Copps
Oscar Colby
W. L. Cox
Ross Cooper
J. H. Cooper
Jas. Cooper
R. C. Cooper
Joe Coyt
G. B. Cardy
Walter Chistenbury
Henry Childs
John Cotter
Warren Card
Walter Card
W. A. Craig
Code Carter
Ed Cox
Chas. Childs
Andy Crabtree
Woody Cross
Geo. Clonly
Ira Chittum

Wm. Disney
John DeWitt
Chas. DeWitt
Mike Dugan
W. B. Dabney
C. A. Duke

H. F. Dagley
M. Donahue
Wm. Denney
J. L. Davis
Jas. Davis
Robt. Davis
Dave Davis
Adam Dulman
Page Duncan
J. F. Dyer
John Daugherty
John Dixon
C. Duff
John Dabney
G. A. Dean
John Dossett
Toney Darego
Burley Dundy
John Dyer

Dock Enson
W. D. Enson
Cleve Everett

Walter H. Finley
John Ferrell
John Finkes
Ulys Farr
Phil Francis
Geo. Foster
Millard Farmer
Herbert Fitzgerald
Budd Fritts
Wiley Foster
James Fritts

W. R. Gasy
—. Groves
John Goins
H. C. Goins
Wm. Goins
John Gileb
C. H. Gaylor
M. L. George
Henry Gross
R. R. Gray
W. R. Gray
Joe Gider
Everett Guimes
Sim Gug

Browder Gallagher
E. L. Green
Joe Graham
Abe Goins
Joe Goins
John P. Gorman

Henry Hatmaker
J. F. Hatmaker
S. Hatmaker
Ben Hatmaker
Jake Hicks
John Hood
Henry Hightower
Chas. Hightower
Dr. J. A. Holmes
J. Henderson
Rose Hayes
Wm. Hatmaker
Lewis Hatmaker
Wm. Hoskins
G. H. Hinchell
Dave Hudson
Frazier Hakins
Jas. Hickman
T. M. Hilton
John Hensley
Allen Hill
Jas. Harman
Henry Hawkins
W. E. Hendron
Mon Hayes
Frank Heatherly
Geo. Heatherly
Sam Huchaby
Dick Howe
John Howe
John Hill
Joe Hill
Usser Harris
Jas. Hamby
Iva Hamby
Chas. Haynes
Jas. Haywood
W. H. Harris
Henry Harman
Dave Hill
W. P. Hammell
Steve Hutton
H. Hamilton
Will Hammock

J. W. Howell

Arthur Irish
C. I. Irish
Hoyle Irish
G. E. Irish

Jas. Johnson
L. P. Johnson
Verge Johnson
Wm. Jones
J. L. Jones
Jas. Jackson

J. H. Kinchell
W. R. Keath
Bud Kintrell
Luke Kesterson

F. P. Lynch
Anderson Lindsey
Dick Lowe
Hugh Lerue
Wm. Love
Earle Lively
Denny Lumbar
Sid Lay
Wiley Lively
J. H. Loving
Louis Lindsey
John Leonard
Frank Long
Frank Lee
I. C. Lowe
Claude Lowe

John Moore
J. L. Murray
Jas. Moore
G. E. Moore
Chas. Moore
Ernest McDowell
Jack Marshall
J. J. May
Grats McKinney
Wm. Mensing
C. E. Miller
Wm. Mize
Wm. Moss
E. McDaniels
Geo. Miller

John Miller
Emory Maiden
Condy Maiden
Millard Marten
Robt. Mays
J. J. Minz
A. T. Murray
Jud MeGhee
M. H. MeGhee
Wm. Maston
Dock Massingill
Jas. Massingill
Chas. Mallory
Sam Marsh
—. McCrory
Dr. C. H. Morgan

J. R. Nash
Albert Newcomb
W. L. Nelson
J. J. Newby

James F. Overton
E. M. Owens
August Oaks
Curtis Ossabel
Alex. Orr

Kelly Patterson
Thomas Prater
Geo. Phillips
J. K. Perry
Isaac Perry
Isaac Phillips
Alvis Pike
Cage Phillips
—. Pippin
A. H. Parris
W. A. Pless
Dock Peere
—. Pitman
J. W. Paul
John Phillips
Chas. Probert
D. F. Portwood

M. F. Queener
Wm. Queener

J. W. Rosser
John Robinson
Jos. Rigsby
Richard Rigsby
Ed Rigsby
Carlos Robbins
Geo. Riggs
Hugh Riggs
Wm. Roberts
J. M. Riddens
Chas. Ritter
Frank Ritter, Jr.
Hugh Robbins
Joe Rodgers
C. D. Rosser
Park Rine
Jess Ray
Thos. Riddens
J. D. Riddens
Henry Rutherford
C. O. Roberts
J. R. Richardson
Thomas Richards
William Richards
John Richards
Dr. Dan Richards
Joseph Richards
John Rose
Dr. J. J. Rutledge
J. T. Ryan
J. A. Rodenbush
Francisco Revere
Ed Russell
Arthur Russell
J. D. Rucker

W. H. Seinknecht
Sam Sharp
Henry Smith
E. Sharp
Hugh Stokes
John Spouse
R. Simms
R. C. Speaks
G. A. Sharp
E. P. Sharp
Robt. Slover
W. G. Srodes

John Sharp
A. Street
L. O. Stone
W. G. Sharp
Harley Smith
Whit Smith
E. O. Smith
Hale Stickney
A. Scarbrough
Perry Stonecipher
Jos. Stonecipher
Sam Stonecipher
Willie Stonecipher
H. Sharp
Will Scoggins
Arthur Simmons
John Stooksbury
Wm. Savage
Bud Sueat
Lawrence Simmons
Geo. E. Sylvester
Aug. Shannet
Hubert Sparks
E. L. Sharp
Enoch Sharp
Garfield Sharp
A. L. Slover
Thos. Stansbury
Clay Slover
E. B. Sutton
W. H. Steers
Adam Shaffner
W. D. Smith
W. H. Smith
Elza Southern
W. Saylor

Joe Tine
Riley Tidwell
Chas. Teasely
R. S. Turnbull
I. C. Tow
Claude Tow
Bib Tipple
Steve Thomas
Lum Triplett
Thos. Tinker
Wm. Tinker

John Tinker
C. C. Thomas
Dent Tucker
Walter Thurman
Frank Taylor
Ethel Troster
—. Talby
Sam Underwood

William Vowel
W. C. Vandergriff
A. H. Vershat
Joe Vasey
Walter Veneble

Monroe Weaver
W. L. Wilson
S. T. Wallace
Andy Wallace
Wm. Williams
A. B. Welch
Chas. Walls
Cal White
J. T. Walker
Chas. Walker
Ab Williams
O. W. Wood
John M. Wood
Lee Weever
James Wormsley
Wm. Wormsley
J. T. Williams
W. N. Willingham
R. W. Walden
J. W. Walker
Chas. Wood
John Waine
Thos. Waine
J. S. Wood
G. W. Weaver
A. M. Weaver
C. I. Williams
C. S. Wood
Lum White
Arthur Wade
Dave Wood
Chas Wortham
—. Wade

W. A. Yeager

ACCIDENTS IN COAL MINES, THEIR CAUSES AND PREVENTION

The main object of this department is to safeguard to as great an extent as possible the lives and health of those engaged in mining operations. I have felt, therefore, that it would be proper here to go into the question of mine accidents with considerable detail, discussing their causes and the possible ways in which they can be reduced to a minimum.

In considering the causes of the accidents and fatalities in our coal mines, it is well to treat separately those individual accidents, which are constantly occurring, and which may be naturally considered as incident to the hazardous occupation of mining, and those which are occasioned by a general mine explosion.

Among the causes of the former in relation to their importance are: Falls of roof or coal, mine haulage, electricity, explosives, etc.

In 1910, according to the U. S. Bureau of Mines, 47 per cent of all fatal accidents in the United States were from falls, while 16 per cent were in connection with mine haulage. It is therefore important that these causes be given especial attention.

These accidents from falls are difficult for the mine inspector to deal with. They depend very largely on conditions which are changing daily, while the inspector can only visit a mine at intervals of several months. While in some instances the failure of the operator to keep his mine in good condition may be contributary to accidents, the causes of the majority of them may be attributed to that indifference to danger so often seen where men are constantly associated with it, to thoughtlessness, carelessness, or willingness to take risk, on the part of the miner, and to insufficient supervision on the part of the foremen.

While the operator should be required to do everything possible towards keeping his mine in good shape in this regard, it is only with an increased knowledge of mining and a realization of danger on the part of the miner, closer supervision from the foremen, and more perfect discipline that this class of accidents can be materially lowered.

While these accidents often occur to old experienced men who should know and avoid the danger, but who take unnecessary chances, some of them are occasioned by the ignorance of inexperienced men; and foremen should be careful not to allow such men to work in places where good judgment is required on account of bad roof conditions, or where they may be placed in special danger through their ignorance of mining.

A careful and frequent examination of all working places by foremen or assistants, and a strict and immediate compliance of all order relative to propping and taking down dangerous roof, would also diminish this cause of accidents.

The mere order to set a prop, or take down a loose piece of top, and waiting for the man to take his own time to do it, will not answer. Many a life has been lost by waiting to get just one more car loaded before setting the prop.

The accidents occasioned by haulage, perhaps, depend to a larger extent on the condition of the mine and equipment, but in this case also the personal equation, especially in regard to mine discipline, enters largely into the cause.

While the man killed may have violated the law by riding a loaded trip, the wreck which was the direct cause of his death might not have occurred if the track had been in good condition. Here again the maintenance of the equipment, the question of discipline, and the impressing upon the men their personal responsibility in this matter, seem to be the best remedies.

The same may be said, to a greater or less extent in regard to most of the other causes of the individual accidents.

While, of course, some of these accidents will always occur and may be classed as unavoidable, they should not reach the number they do, and it is hoped that with frequent inspection, and a hearty co-operation of both operators and miners in the interest of greater safety, that they may be materially reduced.

EXPLOSIONS.

The causes of accidents just considered, taken over a term of years throughout the United States as well as in our own State, contribute a larger death roll, and should be given careful consideration. However, accidents of this sort do not shock the community as do those terrible disasters occasioned by gas or dust explosions, which sometimes sacrifice the lives of all or nearly all the men in a mine in a single moment.

While even by the most rigid inspection and regulations these disasters never have been, or possibly never will be entirely eliminated, too great attention cannot be given to this subject.

GAS.

The presence of gas in a mine is not, like dust, merely a possible element which may cause danger, but is a direct and positive danger. The exact amount where it becomes explosive is definitely known, and, when the naked light is used, it must be eliminated or an explosion is sure.

Consequently provisions are made in such a mine whereby no large quantities are allowed to collect; and if through neglect or laxity of any kind, small amounts are allowed to gather, where the naked light is used, a local explosion is sure to occur at once, and to occur before the whole mine can be included in the danger zone. For the naked lamp being always present, which is the initial cause, the explosion comes as soon as the first accumulation of gas is formed, and before the whole mine can become in a dangerous condition. Thus, except by the gravest negligence on the part of the operator, or in a mine liable to a sudden and large outburst of gas, a general gas explosion is not liable to occur. This liability of sudden outburst of considerable bodies of gas is, fortunately, not a condition found in this field. It may be well to mention here that when small bodies of gas are ignited the result is more often an intense flame, burning for a definite time, than a manifestation of force such as is occasioned by powder or dynamite. Gas to burn with explosive effect requires the mixture of a definite amount of air, which with the small pocket of gas, as usually found, is the exception rather than the rule. The ignition of such gas is, however, extremely dangerous on account of the large volume of flame produced, and is included in the term explosion as here used.

A mine operated exclusively by safety lamps, while affording more protection against the local explosion, sometimes through the very fact of relying too much on the protection they afford, allows a degree of laxity in regard to the gas accumulation of the mine which might bring the whole mine up to the danger mark, awaiting only the initial cause in the shape of a lamp imperfection, or infringement of rules in regard to shots or in other manner to cause the general explosion. In other words, if the mine is in a condition to explode, it is only a question of time when the initial cause will come.

In a mine, therefore, which generates any amount of gas, eternal vigilance is at all times necessary. The ventilating current should be ample, with a good reserve

power, and should be reliable and continuous. The air should be taken well into all the faces by frequent break through, or by line brattice when necessary. Doors should be avoided as much as possible, especially where upon being left open, would short circuit any considerable part of the mine, and no gas should be allowed to collect in any place whether advancing heading, room or old workings.

The total amount of the ventilating current should always be sufficient that the return air should never carry over one-half per cent of gas, and preferably smaller.

A body of gas large enough to cause even local danger is a constant menace, and no matter how well it is fenced off by danger marks, should not be tolerated. In such a mine the most perfect system of inspection by competent and reliable men, and the most rigid discipline is necessary.

Fortunately at this time we have very few mines liberating gas in dangerous quantities, and none where the same cannot be well taken care of by adequate ventilation; and we have no mine in this State where the locked safety lamp is used for mining purposes.

In considering gas in the above, I have taken it only as a danger by itself. There is another danger in gas which must not be neglected, and that is as the initial cause of a dust explosion which will be considered hereafter.

DUST.

It has been positively demonstrated that coal dust, even in comparatively small quantities, and even without the presence of any gas, is explosive.

We must assume, and it is a fact, that all mines which are not naturally wet from seepage of surface or ground waters are at times more or less dusty; for bituminous coal cannot be mined or handled without making dust.

Unlike gas, the exact point at which a mine becomes sufficiently dusty to be dangerous is not known. In a mine without dust, if a modern test lamp fails to show any indications of gas, we may safely assume that as long as it remains in that condition, no explosion will take place. A dry and more or less dusty mine may, however, be operated for years, without accident, and then, without apparent change of conditions, may explode over its entire area.

Investigators have decided that the presence of gas, even in quantities smaller than can be detected with a safety lamp, may become an important factor in a dust explosion, causing it to ignite and propagate much easier than when the dust alone is present.

A number of assays of return air have been made in several of what are known as our non gasy mines, and, in nearly every instance, a trace of gas, usually from one to two-tenths of one per cent, has been found. While this is in the normal air current, one can readily see that by any disarrangement of the ventilating system, either by the stopping of the fan or short circuiting a part of the mine by an open door, that this per cent of gas could be increased to several times this amount. While it is unlikely that this per cent would be enough, in this class of mines, to be any serious menace from gas alone, it might readily raise the danger point of a mine to the point where a dust explosion could be easily propagated.

In a mine known to be liberating gas, therefore, in quantities that will show on a lamp, much greater attention should be paid to the question of dust.

In considering the causes and remedies in this question of dust, we must look at it from two different points: First, the initial cause of the explosive; second, the condition of the mine whereby an explosion is possible.

It is generally conceded that a dust explosion can only be propagated when the

dust is in suspension in the air, and is acted on by a flame of considerable heat or duration.

The causes which are known to produce this combination, are the windy or blown out shot, the accidental explosion of powder or dynamite, and the gas explosion. It is also supposed that the result could be obtained by a strong electric arc, such as might be produced by a short circuit, or even the flame from a torch or large open light, taken in connection with a cloud of dust which might be raised by a wreck or heavy fall,—as a few instances have occurred which could seem to be accounted for only on these grounds.

In almost every case, however, the initial cause, when determined, can be traced to the windy shot or the explosion of powder or gas.

The Windy Shot.—Where black powder is used the improperly burdened or tamped hole, or the excessive use of powder, may cause a windy or a blown out shot. Where coal dust is used instead of clay for tamping, the flame from a blown out shot, is often greatly increased. Shots on the solid usually have to be much heavier than where coal is cut, and the burden is more difficult to judge, they, therefore, more often result in a windy. While care, judgment, and eliminating of solid shooting will greatly reduce the windy shot, it is unlikely that it could be entirely eliminated, as with the greatest care and judgment a hidden seam or crack in the coal might cause what would otherwise be a well burdened hole to develop a windy.

The best safeguard, in this matter, is the exclusive use of some form of permissible explosive, which, within the limit of the allowable charge, will not set off either gas or dust.

It will be seen therefore that all efforts to make a dusty mine safe by relying entirely on eliminating the initial cause of the explosion may be unavailing on account of the personal factor, that is, the carelessness, or criminal negligence, or lack of judgment of a single workman. The use of shot firers in a dangerous mine, and having all shooting done when the men are on the outside, would naturally decrease the chances for any great loss of life, and in certain mines, especially where gas was also present, should be insisted on. Still there are some of the dangers which could not be eliminated in this way. The use of the permissible explosive, as it is only exploded by the use of a detonator, is also a precaution against an accidental powder explosion. With reference to gas, the precautions heretofore mentioned are all that seem practicable.

While the permissible explosive is undoubtedly a great factor for safety, and should be used, if possible, in all gasy and dusty mines, it is well known that no brands are safe except within certain charge limits.

While every precaution possible should be taken in regard to the initial cause, it is the second part of the proposition, that of keeping the mine in such a shape that an explosion could not take place, that we must mostly rely on.

A large number of remedies have been suggested for the dusty mine, and each has its advantages, as well as its limitations. Before considering these remedies, it will be well to note the almost total absence of the dust explosion in the summer months. In a list of seventy-three explosions occurring since 1884, and involving the sacrifice of nearly five thousand lives, not a single instance is recorded of an explosion from the cause of dust, as occurring in the month of July or August. While this list was unofficial and probably incomplete, it will answer to illustrate the fact above mentioned.

It is a well-known fact that the warmer the air the more moisture it is capable of holding in suspension, while air at or below the freezing point can hold very little moisture. The air in our mines maintains a fairly normal temperature the year round, varying in different mines, usually between 60 and 70 degrees. Thus when the warm summer air, even when carrying no very high per cent of moisture, is cooled to the mine temperature, the amount of moisture present, is, in a majority of cases more than enough to entirely saturate the mine air, and the result is a condensation of moisture throughout the mine.

In the winter season the reverse takes place. The cold air entering the mine carries a very small per cent of moisture, and, when raised to the mine temperature, has a great capacity for moisture, continually taking up the same and leaving the mine dryer and dryer as the cold weather continues. To illustrate this drying out of the mine: a hygrometer reading taken at one of our mines during the winter months showed with an outside temperature of 38 degrees a relative humidity or per cent of moisture present of 76 per cent. This air would carry 3.9 gallons of moisture per 100,000 cubic feet of air. The return air, raised to the mine temperature of 64 degrees, and showing in the return 95 per cent of moisture was carrying 10.7 gallons, that is 6.8 gallons of moisture was carried out of the mine with every 100,000 cubic feet of air, as the ventilating current of this mine was approximately 70,000 feet per minute, in the 24 hours, an amount of moisture equal to 6,854 gallons of water was evaporated from this mine. This is not an exceptional case, and in very cold weather it is probable that from most of our larger mines a much greater amount of water is taken each day.

Steam.—If we could in any way artificially introduce sufficient moisture into the mine air to produce the results obtained in the warm months, our mines could be made comparatively safe from the dust explosion. This is a different proposition, however, and can only be approximated. Steam, either exhaust or live, is considered as one of the best methods of humidifying a mine. The result when a sufficient amount of steam is introduced into the intake air, is that the air will be somewhat heated at that point, and will absorb part of the moisture. As the air, however, is not sufficiently heated to equal the normal temperature of the mine a larger part of this moisture is carried along in the shape of a fog, and, as the temperature gradually increases, it will be absorbed. In this way with a sufficient steam a very high degree of saturation may be induced. The mere fact of the mine air being in high degree of saturation, however, is not sufficient. It must be made to deposit its moisture. This can only be done by having the air wholly or nearly saturated at the working places, or having the temperature of the air higher than that of the rib and roof. In some mines this seems to occur under the natural condition of the operation of the mine.

In some mines good results have been obtained in heating the intake air at the time of applying the steam, giving a high degree of saturation at once.

It seems to be impractical to use this system in some cases, as the majority of our mines have the intake air where the fog would interfere with the use of air course or entry, for haulage and traveling ways.

There seems to be no good reason why the system of direct air instead of exhaust should not be used on many of these mines, the use of haulage on the return air having the additional advantage that the dust produced and blown from the rapidly moving trip would be carried towards the outside instead of inward towards

the faces. The possibility of the contamination of the return with gas to anything near the danger point being so slight under our conditions as to be neglected.

There are also undoubtedly some instances where steam would effect the roof. This danger is in all probabilities not nearly as great as most operators think. The bad effect on the roof occasioned by the live steam pipes, taken into mines for running pumps and such uses of power, is caused to a far greater extent by the alternate heating and cooling, than by the moisture. While an intermittent use of steam for moisture might give bad results from this reason, where the system is maintained regularly and the temperature remaining about the same, it is likely that little damage would result from this cause. The efficiency of this system of taking care of dust is probably greater than any other, and the expense, when once installed, less.

Sprays.—Efforts have been made to substitute sprays in the intake air for steam; and a number of spray heads, which can be used on pipe lines under pressure and throw a very fine spray into the air, are on the market. While these are of great advantage, especially in connection with some of the systems of sprinkling, they do not do as effective work as steam for the reason that the spray tends to lower the temperature, instead of raising it as steam does. It is therefore difficult to get a degree of saturation at a temperature where there will be a deposition of moisture.

Sprinkling.—Sprinkling from pipe lines under pressure is another method which can be very effectively used. Pipe lines, usually about two inches in diameter, are laid on the entries, with hose connection at convenient intervals. Smaller pipes are taken up into all working rooms, and hose is used to keep all parts of the mine thoroughly sprinkled. This system is especially recommended for wetting down the dust from mining machines. That type of sprinkling car which is operated under pressure will also do effective work, if systematically used. In both these methods much of the efficiency depends on the washing of the fine and dangerous dust from the roof, rib and gob, as well as the moistening of the mine. Sprays on the intake air can be used to advantage with these systems, making the moisture thus put on, slower in drying out. The old type of gravity car, which waters the floor only, can be considered as of little dependence for systematic use. The great objection is that it wets the road way only, and does not affect the fine and dangerous dust on the rib or in the gob. It can be, perhaps, used to some advantage locally, or in connection with some of the other systems. The great disadvantage of all of these systems of sprinkling, in comparison with that of humidifying the mine air, is that there are always certain portions of the mine such as air courses and behind gobs that cannot be reached by sprinkling.

Salt.—Calcium chloride, also common salt, is recommended, and is successfully used in some states. Its use is especially recommended for those places which cannot be reached by a sprinkling system. Its property of absorbing the moisture from the air and keeping moist the locality where it is spread, makes it valuable. It should be used dry and not in solution, as in the latter state it soaks into the dust where it cannot so well come in contact with the moist air.

Loading Out Dust.—While all dust and slack possible should be at once loaded out of the mine, this cannot alone be relied on to give safety. It has been shown that a very small amount of fine dust will propagate an explosion. According to the best authorities a few ounces per lineal foot of an ordinary sized entry is sufficient. It is readily seen that this much could easily be left on rib or gob after a most careful cleaning up and loading out. It would be much easier to keep an entry damp however than one containing much slack and dust.

STONE DUST.

While there have been some experiments with stone dust for checking or limiting an explosion, there is very little definite data on this subject.

There is no doubt but that inert dust such as stone dust, sand, or even boiler ashes, when applied plentifully on the roadways, would have a beneficial effect in checking an explosion.

With the type of mine cars so commonly used, which allow so much coal dust and slack to be scattered along the roadways, it is doubtful if this system would be at all practical in our mines, and certainly could not be relied on to the exclusion of the systems heretofore mentioned.

BRATTICES.

The question of brattices has, I believe, much to do with the force and extent of an explosion when once it has started. Experience has shown that it is not possible or at least practical to make brattices strong enough to withstand an explosion. Where brattices are made very strong, as in the case of the thick gob brattices packed tight, the accumulative force of the explosion thus confined is undoubtedly much greater, and the tendency to propagate, when the brattice is ultimately blown out is increased.

A light brattice, which gives away at the first force of the explosion, allowing it to spread, lose force and more quickly die out.

A good brattice should be strong and substantial and tight, but should not be excessively heavy, if in a mine where an explosion might occur.

The objection to the wood stopping so universal'y used, is that it is extremely difficult to keep it perfectly air tight, and the aggregate loss of air, where the mine is extensive, is considerable. There is also always that increased danger of fire, especially if the brattices are old and subject to dry rot.

MINE FIRES.

Mine fires are not ordinarily considered as a serious menace, as far as loss of life is concerned, when compared with the gas or dust explosion.

A number of our most serious disasters throughout the United States, involving great loss of life, can, however, be attributed to this cause alone.

While Tennessee has thus far been exempt from any serious disasters from this cause, it will be well to seriously consider this danger in the light of what has occurred in other states, as a feeling of too great security sometimes leads to great danger.

Probably the most frequent cause of the mine fire is the ignition of the coal at the face by the lighting of small gas feeders from the shot of black powder. These fires are often so small as to escape, at first, the inspection of the shot firer, but when left alone they often develop into serious fires. As the amount and velocity of the air in these places is usually limited, and the fire in the coal alone is slow in gaining headway, these fires are not often to be considered as a serious menace to life. They are, however, often stubborn and difficult to handle, sometimes getting beyond control and necessitating bratticing off that section of the mine, with great loss, and the subsequent danger of opening them up. This class of fire can be almost universally avoided by the use of the permissible explosive, and this alone is a very strong argument for its use in many cases.

The greatest danger of any general loss of life from fire, is that of fires occurring where there is a considerable amount of inflammable material such as may be found in underground stables, engine or pump stations, or where there is a large amount of dry timbering. This danger is greatly increased if there is an air current of high velocity.

The fact that a very large per cent of the mines in Tennessee are drift mines, with comparatively few stables or places where special danger might exist from this cause, greatly reduces the probability of such a disaster. All proper precautions should, however, be taken in this regard. Stables should not be constructed where there are strong air currents, or on intake air-ways, and should preferably be on a split by themselves; only enough hay and such material should be taken in as is needed for immediate use, and inclosed lights only should be used around the stable. Care should be taken at other places to limit the use of combustible material, and in all places of this character water for fire fighting, in barrels, or under pressure with hose, should always be at hand.

Another point which is often neglected is that of rotten timber. Old timber, especially brattices which have been replaced because of dry rot, where no dampness is present, is very inflammable, and is especially dangerous because of often holding fire for so long a time before developing into a perceptible blaze. In case of an explosion especially, it would add greatly to the danger and difficulty of the rescue work. Great care should be taken to have such material always loaded out of the mine. Buildings or structure on the outside over or close to intake air ways should be avoided, especially if the ventilating current could not be immediately reversed.

MINE LAWS.

Whenever public attention is called to any considerable mine accident or disaster, it is a general opinion that more stringent laws on the subject would have prevented the same.

While it may be often the case that other laws or regulations are needed, the matter is not as simple as is generally supposed. Some of the conditions entering into the question, and remedies to be applied, are as yet imperfectly known, and still under investigation and there is quite a variance of opinion of our best authorities in these matters. Under these conditions it is easily to be seen that a law might be passed designed to give safety from some particular danger, and under certain conditions work a harm in other directions.

Laws of this character should not be hastily passed, and only after having been carefully reviewed and considered by the best authority on this subject.

The fact that laws are included in the mining codes of other states and are found beneficial, is not in every case conclusive evidence that they are needed by us, as different states present sometimes very different mining conditions.

There are, however, some few laws which I think should be added to our mining code, while a number of others should be revised and amended.

The present code, on the whole, is, I consider well adapted to our conditions, and I do not think any general revision of the mining laws would be advantageous or necessary.

PERMISSIBLE EXPLOSIVES.

Permissible explosives are so well known to mining men that much detail description of same is unnecessary. The term simply means that the particular brand so

designated has passed certain tests by the U. S. Bureau of Mines, and within the limit of charge recommended, will not ignite dust, or a highly inflammable gas mixture. As a class these explosives are in the nature of a dynamite and must be exploded by a detonator.

They are, as a rule, much slower in action than dynamite, so they can be successfully used in coal. The principle determining their safety is the addition in their manufacture of substances, which reduce the length, duration, and heat of the flame, to a point where it will not ignite the gas or dust.

One objection often argued by both miner and operator against the use of this explosive is that "it does not work as well as black powder." While in a few instances there may be some merit to this objection. It is probable that in most cases either the brand best adapted to the particular coal has not been selected, or the miner has not become sufficiently experienced in its use. A miner who has been using black powder for years often becomes very expert in judging his burden and the best way to get maximum results from same. Permissibles being a different type of explosive, it is not strange that at first he fails to get satisfactory results.

In a number of the mining states a very large per cent of the coal is shot with permissibles, and as there is no doubt but what it adds a very great factor for safety, it should be used as far as possible in all mines where there would be any danger from gas or dust.

Miners Circular No. 6, on *Permissible Explosives*, published by the U. S. Bureau of Mines, gives a list of permissibles up to January, 1912, and much valuable information on this subject, and should be consulted by those wishing to find a brand best adapted to their working conditions.

FIRST AID AND MINE RESCUE WORK.

Although there has been little attention paid in the mines of this State to first aid and mine rescue movements, some interest is now being awakened in these subjects.

First Aid Work.—This is a subject which each miner should recognize as of personal interest to him, and while it must of necessity be a miner's movement, it is one to which all operators should give their hearty support.

As long as we have mines we may expect that we will have accidents, and no one working in the mines can expect that he will be exempt from the chances of same. Our mines are increasing in size, and often an accident occurs several miles from the outside. Transportation is difficult and subject to delay, and the importance of having some one at hand who understands the principles of first aid to the injured, cannot be overestimated. This knowledge would not only in most instances minimize the amount of suffering, but often prevent permanent disability.

In many cases, too, on the treatment for the first hour or so after the accident, depends the question of life or death of the victim.

The only way to provide for these emergencies is that as large a number of the miners as is possible should be trained in this work. To the National Red Cross, who has a department in this work, and the Bureau of Mines, who include also this training in their instruction, we must look at present for our start in this movement.

On account of the increasing interest in this subject over the country not only in the mining field but the railroad and manufacturing as well, we can only expect our share of attention from these sources.

It is hoped, however, that another year may be able to show up considerable progress along this line.

Mine Rescue Work.—While every precaution should be used against the possibility of an explosion or general mine disaster, we should however, not neglect to be in some degree prepared in case of such occurrence. The Oxygen Breathing Apparatus is recognized as not only being of great value in such cases, but also in cases of mine fires. It would be of great advantage if we had a number of men in each mining field with thorough training in the use of this apparatus. Although the Bureau of Mines is always ready to lend assistance at such times, there is no doubt but more efficient work could be done by equally trained men who had the additional advantage of more intimate knowledge of local conditions and in many cases a personal acquaintance with the mine.

While it would be of considerable advantage, if a number of our mines would install an outfit of these apparatus, the mere installation, without the training of men in their use would be of doubtful value, for it would not be practical or safe in an emergency to put this apparatus into the hands of untried or untrained men.

The Federal Bureau of Mines, which has a permanent station at Knoxville, gives a very thorough course of training with this apparatus, and it is hoped that within the next year quite an additional number of men will receive this training.

BRIEF STATISTICS, 1911.

The following statement gives brief statistics of all operations in Tennessee engaged in the production of coal and other mineral substances, or the reduction of mineral products in 1911.

Brief Statistics, 1911.

PRODUCT	Quantity of Product	Value of Product	Total Number of Employes	Average Wages Paid Per Day	Total Amount Paid for Labor
Barytes (short tons)	4,106	$ 5,079	44	$ 1.10	$ 3,999
Bauxite (long tons)	3,265	11,428	25	1.50	7,500
Brick and tile	----------	1,157,328	1,840	1 43	478,367
Cement (bbls)	1,210,453	876,660	470	1.74	261,966
Clay (short tons)	50,229	105,398	176	1.34	60,669
Coal (short tons)	6,466,224	7,071,376	10,825	2.34	5,000.501
Coke (short tons)	333,274	801,945	364	1.35	123,714
Copper (pounds)	18,732,884	2,181,662	758	2.10	485,188
Gas, Gas-coke, Tar and Ammonia	----------	1,110,881	395	1.92	203,606
Gold (fine ounces)	567	11,339	a	a	a
Iron ore (long tons)	467,356	624,963	996	1.73	419,635
Iron, pig (long tons)	324,381	4,033,679	1,012	1.42	412,226
Lime (short tons)	88,252	272,366	320	1.33	101,268
Limestone (short tons)	1,087,375	555,293	1,083	1.46	297,733
Marble (cubic feet)	484,095	853,557	965	1.45	319,212
Mineral Paints (short tons)	1,850	17,400	34	1.93	13,400
Mineral Waters (gallons sold)	1,016,456	87,399	----------	----------	----------
Phosphate rock (long tons)	542,761	1,918,489	2,008	1.21	719,450
Pottery	----------	263,429	258	1.43	104,481
Quarts, crystalline, (short tons)	57,232	31,508	32	1.75	17,881
Sand and Gravel (cubic yards, 2,500 lbs.)	630,063	400,833	303	1.57	95,470
Sandstone (short tons)	450	700	4	1.62	[illegible]300
Silver (fine ounces)	106,660	57,158	a	a	a
Sulphuric acid (short tons)	279,878	1,621,414	a	a	a
Zinc (pounds)	2,234,000	120,600	115	1.50	43,584
Total	----------	$ 24,191,884	22,027	$ 1.91	$ 9,170,150

a—Included in copper statistics.

It will be noted from the above that coal, both as to value of product, and as the employment of labor, easily occupies first place in the mineral operations of the state. The value of coal produced being 29.23% of the total values of all mineral products; the number of men employed in coal production being 49.14% of total men employed, while the amount paid for labor in coal is 54.53% of the total amount paid for labor in all mineral operations.

Iron occupies second place as to value of product, the per cent of value of iron in relation to total value of mineral products being 16.67%. The amount paid for labor in the production of iron, including that of producing the iron ore being 9.07% of the total paid for labor in all mineral productions.

When it comes to dealing in totals of value, there are some duplications in the above that should be considered. This duplication of value affects totals only and not the value of any individual product, nor the number of employees, nor amounts paid same.

Pig iron is manufactured from iron ore, coke and limestone; the values of such of these products as are used in its manufacture have already been given under their respective headings, or were brought from other states, form a part also in the value of the pig iron.

The clay mined in Tennessee to be sold to commercial operators is principally consumed in other states; a certain amount is however sold in this state and manufactured into brick, tile, pottery, or other clay products, and the value of the clay thus sold is also considered in the value of clay products.

The value of the coke produced also includes the value of the coal from which it is manufactured.

The value of copper includes that of the coke, limestone, crystalline quartz, and other minerals used in its reduction.

And the value of gas, gashouse coke, tar and ammonia, includes the value of the coal and oil, and other minerals, from which it is manufactured.

There should therefore be deducted from the total value of minerals produced in the state, the value of the following products which have already been considered, or have been shipped in from other states.

Value of clay sold to Tennessee manufacturers		$ 3,735
Value of coal manufactured into coke		596,706
Value of coal and all other minerals used in the manufacture of gas, gas coke, tar and ammonia		231,950
Value of coke, limestone, quartz, etc., used in the reduction of copper		231,474
Used in the manufacture of pig iron:		
Coke	$ 1,180,199	
Iron Ore	1,385,334	
Limestone (flux)	138,819	
Other minerals	14,666	$ 2,719,018
Total deductions for all mineral products duplicated		$ 3,782,883
Total value of mineral products as shown in general table		$24,191,884
Total net value mineral products after deducting duplication of values		$20,409,001

FINANCIAL STATEMENT.

The following statement gives the revenues accruing to the State, under the provisions of the mining laws, and also total of all disbursements during 1911:

Total amount accruing to state on account of mine inspections	$ 6,765.00
Total amount accruing to state on account of mine foreman examinations	390.00
Total revenue	$ 7,155.00
Total disbursements	$ 14,100.13

In a comparison of the above with the report of 1910, it may be noted that the total revenue in 1910 amounted $3,020.00, showing an excess in 1911 of $4,135.00.

The disbursements in 1910 were $13,440.76, which is $659.37 less than in 1911.

The total cost of this department to the state in 1910 and 1911 being:

1910	$ 10,420.76
1911	6,945.13

Total disbursements from January 1, 1911, to December 31, 1912, inclusive.

ACCOUNTS	MONTHS AND AMOUNTS						
	Jan.	Feb.	March	April	May	June	July
Salaries:							
Chief Mine Inspector	$ 200.00	$ 200.00	$ 200.00	$ 200.00	$ 200.00	$ 200.00	$ 200.00
Dist. Inspector East. Division	141.66	141.66	141.66	141.66	141.66		70.83
Dist. Inspector Middle Division	141.66	141.66	141.66	141.66	141.66	141.66	141.66
District Inspector and Statistician	141.66	141.66	159.98	191.66	191.66	191.66	191.66
Clerk	125.00	125.00	135.00	150.00	150.00	150.00	150.00
Stenographer						83.33	83.33
Traveling Expenses							
Chief Mine Inspector	58.90	96.12	90.80	136.50	89.75	61.15	41.80
District Inspector Eastern Division	36.40	42.60	45.60	32.10	48.95		34.67
District Inspector Middle Division	22.05	75.15	78.15	82.35	35.40	38.26	41.60
District Inspector and Statistician	15.19	57.62	59.30		37.85		
Office Expenses, Stationery, Blanks, etc.	91.60	47.35	134.95	36.79	367.72	70.94	46.05
Postage	75.00	70.00	10.00				
Mine Inspectors' Supplies		13.50		83.80			
Furniture and Fixtures						57.25	20.00
Printing		34.00					
Total	$ 1,049.12	$ 1,186.32	$ 1,197.10	$ 1,196.52	$ 1,294.65	$ 994.25	$ 1,021.60

ACCOUNTS	MONTHS AND AMOUNTS					
	Aug.	Sept.	Oct.	Nov.	Dec.	Gr. Total
Salaries:						
Chief Mine Inspector	$ 200.00	$ 200.00	$ 200.00	$ 200.00	$ 200.00	$ 2,400.00
Dist. Inspector East. Division	141.66	141.66	141.66	141.66	141.66	1,487.43
District Inspector Middle Division	141.66	141.66	141.66	141.66	141.66	1,699.92
District Inspector and Statistician	191.66	191.66	191.66	191.66	191.66	2,168.24
Clerk	150.00	150.00	150.00	150.00	150.00	1,325.00
Stenographer	83.33	83.33	83.33	83.33	83.33	583.31
Traveling Expenses:						
Chief Mine Inspector	38.05	49.85	60.18	61.85	53.55	838.50
District Inspector Eastern Division	37.30	46.25	48.15	51.30	50.75	474.07
District Inspector Middle Division	20.75	35.10	58.39	37.37	21.00	546.07
District Inspector and Statistician		36.75			4.00	210.71
Office Expenses, Stationery, Blanks, etc.	29.80	22.20	40.10	50.10	32.80	970.40
Postage			1.00	71.00	.50	227.50
Mine Inspector's Supplies	4.70	10.50	51.23	12.40	12.10	188.23
Furniture and Fixtures						77.25
Printing					570.00	604.00
Total	$ 1,038.91	$ 1,108.96	$ 1,167.36	$ 1,192.83	$ 1,653.01	$ 14,100 63

MINE INSPECTIONS IN 1911.

This table gives the mine inspections in detail for 1911, and the fees due the State by each operator as provided for by law.

OPERATOR		NAME OF MINE	MONTH AND DAY OF INSPECTION												No. of Inspections	Av. No. Men	Fee for Inspection	Tot. Fee for Mine	Total Fee for Operation
NAME	POST OFFICE		Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.					
ANDERSON COUNTY																			
Black Diamond Coal Co.	Knoxville	Black Diamond 1							25			25			2	105	35	70	
Black Diamond Coal Co.	Knoxville	Black Diamond 5							26			26			2	129	35	70	140.00
Coal Creek Coal Co.	Knoxville	Fraterville							28			20			2	73	25	50	
Coal Creek Coal Co.	Knoxville	Taft								11		20			2	16	15	30	
Coal Creek Coal Co.	Knoxville	Thistle								11		21			2	60	25	50	130.00
Knoxville Iron Co.	Knoxville	Cross Mt. 1								3		30			2	122	35	70	
Knoxville Iron Co.	Knoxville	Cross Mt. 3								3		30			2	39	20	40	110.00
Poplar Creek Coal and Iron Co.	Knoxville	Piedmont 2							20			20			2	25	20	40	
Poplar Creek Coal and Iron Co.	Knoxville	Piedmont 4								9					1	18	15	15	55.00
Royal Coal and Coke Co.	Pless	Brookside								4			1		2	11	10	20	
Royal Coal and Coke Co.	Pless	Buck Mt.					11			4			1		3	75	30	90	110.00
Tennessee Coal Co.	Knoxville	Middle Ridge								2		31			2	15	15	30	
Tennessee Coal Co.	Knoxville	Tennessee					9			2		31			3	103	35	105	135.00
Wind Rock Coal and Coke Co.	Wind Rock	Windrock								10			7		2	190	35	70	70.00
BLEDSOE COUNTY																			
Atpontley Coal Co.	Atpontley	Atpontley 6			17			20					7		3	48	20	60	60.00
CAMPBELL COUNTY																			
Anchor Coal Co.	Knoxville	Anchor									5			5	2	41	20	40	40 00
Bear Wallow Coal Co.	Caryville	Bear Wallow					4		24			19			3	39	20	60	60.00
Block Coal and Coke Co.	Block	Block 2								25					1	7	5	5	
Block Coal and Coke Co.	Block	Block 3								25			23		2	62	25	50	55.00
Blue Gem Coal Co.	Jellico	Blue Gem Speed								31			28		2	85	30	60	60.00
Campbell Coal Mining Co.	Westbourne	Jackson								28			29		2	124	35	70	70.00
Caryville Coal Co.	Caryville	Caryville					2			22			20		3	72	25	75	75.00
Central Blue Gem Coal Co.	Jellico	Woodward										5			1	14	10	10	10.00

Chaska Coal Co.	Knoxville	Chaska 1									6		5	2	60	25	50	50.00
Davis Creek Coal Co.	Cupp	Davis Creek 1							31					1	48	20	20	20.00
Elk Valley Blue Gem Coal Co.	Elk Valley	Baird, B. G.								6		14		2	12	10	20	20.00
Elk Valley Jellico Coal Co.	Elk Valley	Elk Valley							14			14		2	48	20	40	40.00
Evans Coal Co.	Jellico	Evans							31			28		2	33	20	40	40.00
Falls Branch Coal Co.	Wooldridge	Falls Branch								25				1	72	25	25	
Falls Branch Coal Co.	Wooldridge	Powhatan								25				1	29	20	20	45.00
Jellico Cannel Co.	Newcomb	Jellico Cannel									4			1	18	15	15	15.00
Jones, H. M., Coal Co.	Jellico	Jameson B. G.									3			1	48	20	20	20.00
Kimberly Min. and Mfg. Co.	Knoxville	Kimberly							24					1	95	30	30	30.00
La Follette Coal, Iron and Ry. Co.	La Follette	Gem							18			4		2	185	35	70	
La Follette Coal, Iron and Ry. Co.	La Follette	Rex 1		16					14			2		3	208	35	105	
La Follette Coal, Iron and Ry. Co.	La Follette	Rex 2				16			16			3		3	203	35	105	280.00
Perkins Branch B. G. Coal Co.	Elk Valley	Perkins Branch								6		14		2	9	5	10	10.00
Proctor Coal Co.	Red Ash, Ky.	Indian Mt. 1-2			14						5		4	3	93	30	90	90.00
Red Ash Coal Co.	Caryville	Red Ash				17			21			13		3	101	35	105	105.00
Remy Coal Co.	Gatliff	Remy							28			22		2	100	35	70	70.00
Rich Mt. Coal and Coke Co.	Bennett	Rich Mt.							30			24		2	89	30	60	60.00
Rock Springs Coal Co.	Turley	Rock Springs										22		1	24	15	15	15.00
Royal Coal and Coke Co.	Pless	Cambria			26		27				27			3	45	20	60	
Royal Coal and Coke Co.	Pless	New Royal					27				26			2	9	5	10	70.00
Southern Coal and Coke Co.	Gatliff	Southern 1							23			21		2	109	35	70	70.00
Sun Coal Co.	Caryville	Pee Wee									19			1	10	10	10	
Sun Coal Co.	Caryville	Sun							1		19			2	86	30	60	70.00
Tenn. Jellico Coal Co.	Anthras	Tenn. Jellico								29			6	2	100	35	70	70.00
Westbourne Coal Co.	Westbourne	White Oak							29			22		2	12	10	20	
Westbourne Coal Co.	Westbourne	Westbourne 1-2							29			22		2	135	35	70	90.00
Wooldridge-Jellico Coal Co.	Wooldridge	Marion-Anna								26				1	119	35	35	
Wooldridge-Jellico Coal Co.	Wooldridge	Wooldridge								26				1	20	15	15	50.00
Wynn Coal Co.	Gatliff	Wynn							23			21		2	32	20	40	40.00
Zechini Coal Co.	Newcomb	Italian B. G.									4			1	32	20	20	20.00
Zechini, Peter	Newcomb	Zechini									4			1	39	20	20	20.00
CLAIBORNE COUNTY																		
Bryson Mt. Coal and Coke Co.	Middlesboro, Ky.	Bryson Mt. 1									10			1	45	20	20	
Bryson Mt. Coal and Coke Co	Middlesboro, Ky.	Bryson Mt. 2									11			1	34	20	20	40.00
Campbell Coal Mining Co	Eagan	Buffalo								28			8	2	98	30	60	60.00
Fork Ridge Coal and Coke Co.	Fork Ridge	Fork Ridge 1-2									11			1	327	35	35	
Fork Ridge Coal and Coke Co.	Fork Ridge	Fork Ridge 3									12			1	46	20	20	
Fork Ridge Coal and Coke Co.	Fork Ridge	Fork Ridge 4									12			1	71	5	5	60.00

Mine inspections in 1911 in detail—continued.

OPERATOR		NAME OF MINE	MONTH AND DAY OF INSPECTION												No. of Inspections	Av. No. Men a	Fee for Inspection	Tot. Fee for Mine	Total Fee for Operation
NAME	POST OFFICE		Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.					
King Mt. Coal Co.	Clairfield	King Mt.										3		7	2	51	25	50	50.00
Mingo Coal and Coke Co.	Hartranft	Mingo 5										12			1	65	25	25	25.00
Pruden Coal and Coke Co.	Knoxville	Pruden									27				1	263	35	35	35.00
Standard Jellico Coal Co.	Clairfield	Standard										2		7	2	52	25	50	50.00
Sterling Coal and Coke Co.	Manring	Sterling 1-2										10			1	162	35	35	35.00
Yellow Creek Coal Co.	Middlesboro, Ky.	Yellow Creek 2										13			1	48	20	20	
Yellow Creek Coal Co.	Middlesboro, Ky.	Yellow Creek 3										13			1	49	20	20	40.00
CUMBERLAND COUNTY																			
Clear Creek Coal and Lbr. Co.	Isoline	Clear Creek 5		9					14			20			3	39	20	60	60.00
FENTRESS COUNTY																			
Fentress Coal and Coke Co.	Wilder	Wilder 1-2					17		25			23			3	113	35	105	105.00
GRUNDY COUNTY																			
Ferguson and Harrison	Coalmont	Ferguson						30				12			2	8	5	10	10.00
Sewanee Fuel and Iron Co.	Coalmont	Clouse Hill 1-2										12			1	12	10	10	
Sewanee Fuel and Iron Co.	Coalmont	Coalmont A						30				12			2	29	20	40	
Sewanee Fuel and Iron Co.	Coalmont	Coalmont L			10			30				12			3	57	25	75	
Sewanee Fuel and Iron Co.	Coalmont	Hampton						30							1	12	10	10	135.00
Tennessee Consolidated Coal Co.	Tracy City	East Fork						28							1	86	30	30	
Tennessee Consolidated Coal Co.	Tracy City	Henley						28				13			2	16	15	30	
Tennessee Consolidated Coal Co.	Tracy City	Lone Rock						28							1	7	5	5	
Tennessee Consolidated Coal Co.	Tracy City	Ramsey 1						29				13			2	40	20	40	
Tennessee Consolidated Coal Co.	Tracy City	Reid Hill 1			9			28				13			3	64	25	75	
Tennessee Consolidated Coal Co.	Tracy City	Werner						28							1	20	15	15	195.00
HAMILTON COUNTY																			
Alexander, T. A. and W. A.	Daisy	Alexander						15					2		2	5	5	10	10.00
Durham Coal and Iron Co.	Chattanooga	Big Soddy 7						19		24					2	32	20	40	
Durham Coal and Iron Co.	Chattanooga	Sale Creek						14				30			2	108	35	70	
Durham Coal and Iron Co.	Chattanooga	Soddy 1-2		23				16		23					3	250	35	105	215.00

Montlake Coal Co.	Montlake	Montlake		21					7				2		3	64	25	75	75.00
MARION COUNTY																				
Battle Creek Coal Co.	Orme	Battle Creek			13			23					8		3	162	35	105	105.00
New Etna Coal Co.	Whiteside	Drum Opening											6		1	6	5	5	30.00
New Etna Coal Co.	Whiteside	New Etna 1				24			6				6		3	38	20	60	
New Etna Coal Co.	Whiteside	New Etna 2							6				6		2	9	5	10	120.00
New Etna Coal Co.	Whiteside	Etna 3							6				6		2	9	5	10	
New Etna Coal Co.	Whiteside	New Etna 4							6				6		2	13	10	20	
New Etna Coal Co.	Whiteside	New Etna 5							6				6		2	19	15	30	
New Etna Coal Co.	Whiteside	Etna 6											6		1	15	15	15	
Tennessee Coal, Iron and R. R. Co.	Birmingham, Ala.	Whitwell 1-2			14			22				5			3	200	35	105	
Tennessee Coal, Iron and R.R. Co.	Birmingham, Ala.	Whitwell 5			15										1	134	35	35	140.00
Tennessee Consolidated Coal Co.	Tracy City	Pryor Ridge 1			7			27				11			3	78	30	90	
Tennessee Consolidated Coal Co.	Tracy City	Pryor Ridge 2			7			27				11			3	35	20	60	150.00
MORGAN COUNTY																				
Baker Mining Co.	Coalfield	Baker 1							31			18			2	26	20	40	40.00
Big Brushy Coal and Coke Co.	Petros	Big Brushy 1-2	20			18				15				5	4	68	25	100	100.00
Big Mt. Coal Mining Co.	Oliver Springs	Big Mt.							21			24			2	14	10	20	20.00
Bottomlee and Fagan	Blue Gem	Hooper								17				7	2	4	5	10	10.00
Bowling Coal Co.	Coalfield	Bowling 1				20			31		23				3	74	25	75	75.00
Harriman Coal Co.	Harriman	Harriman								17				7	2	12	10	20	20.00
Jackson, R. H.	Coalfield	Jackson								16				6	2	5	5	10	10.00
Jackson Bros. Coal Co.	Oliver Springs	Jackson									4				1	12	10	10	10.00
Little Brushy Coal Co	Coalfield	Little Brushy								16				6	2	32	20	40	40.00
Oliver Coal Co.	Oliver Springs	Oliver									11				1	16	15	15	15.00
Oliver Springs Coal and Clay Co.	Oliver Springs	Reed							19						1	7	5	5	5.00
Poplar Creek Coal Co.	Oliver Springs	Poplar Creek								9					1	9	5	5	5.00
Prudential Coal Co.	Oliver Springs	Prudential 1					24		21			18			3	60	25	75	75.00
State of Tennessee	Nashville	Brushy Mt. 3	21			19				18		24		29	5	385	35	140	140.00
OVERTON COUNTY																				
Brier Hill Collieries	Crawford	Brier Hill 1					18		25			25			3	58	25	75	
Brier Hill Collieries	Crawford	Brier Hill 2					18		25			25			3	22	15	45	120.00
Overton Coal and Coke Co.	Davidson	Overton							26			25			2	16	15	30	30.00
Peacock Coal Co.	Obey City	Peacock 4-5							27			26			2	7	5	10	10.00
RHEA COUNTY																				
Dayton Coal and Iron Co.	Dayton	Prospect		20					18		28			21	4	98	30	120	
Dayton Coal and Iron Co.	Dayton	Richland		18					18		29			26	4	91	30	120	240.00
Durham Coal and Iron Co.	Chattanooga	Fox 1										31			1	11	10	10	
Durham Coal and Iron Co.	Chattanooga	Fox 2					23	12		25					3	83	30	90	100.00

Mine inspections in 1911 in detail—continued.

OPERATOR		NAME OF MINE	MONTH AND DAY OF INSPECTION												No. of Inspections	Av. No. Men	Fee for Inspection	Tot. Fee for Mine	Total Fee for Operation
NAME	POST OFFICE		Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.					
Penn Coal and Lumber Corporation	Spring City	Penn												1	1	8	5	5	5.00
ROANE COUNTY																			
Roane Iron Co.	Rockwood	McLean								10		19			2	39	20	40	
Roane Iron Co.	Rockwood	Old		27						8		17			3	203	35	105	145.00
SCOTT COUNTY																			
Baker Coal and Coke Co.	Newland	Baker		13											1	12	10	10	10.00
Glen Mary Coal and Coke Co.	Glen Mary	Glen Mary		16						14			24		3	81	30	90	90.00
LeMoyne, J. V.	Isham	LeMoyne		10						1			20		3	22	15	45	45.00
Pine Knot Coal Co.	Harriman	Pine Knot								2			22		2	16	15	30	30.00
Southern Clay Manufacturing Co.	Chattanooga	Southern Clay								4			23		2	14	10	20	20.00
Stanley Coal Co.	Harriman	Stanley 1								2			22		2	23	15	30	
Stanley Coal Co.	Harriman	Stanley 2											22		1	11	10	10	40.00
Terry Coal Co.	Oneida	Oneida								2					1	20	15	15	15.00
Virginia Mining Co.	Roberta	Phillips											21		1	38	20	20	
Virginia Mining Co.	Roberta	Rosser											21		1	14	10	10	
Virginia Mining Co.	Roberta	West Hollow											21		1	23	15	15	45.00
Woods, R. A. and Co.	Oneida	Paint Rock 1		14									22		2	12	10	20	
Woods, R. A. and Co.	Oneida	Paint Rock 2								2			22		2	11	10	20	
Woods, R. A. and Co.	Oneida	Paint Rock 3								3			22		2	11	10	20	60.00
SEQUATCHIE COUNTY																			
Southern Iron and Steel Co.	Birmingham, Ala.	Douglass 2			16			21				6			3	120	35	105	105.00
WHITE COUNTY																			
Bon Air Coal and Iron Co.	Nashville	Bon Air Shaft				6			11			17			3	59	25	75	
Bon Air Coal and Iron Co.	Nashville	Bon Air Six										17			1	57	25	25	
Bon Air Coal and Iron Co.	Nashville	Eastland 1				8			12			18			3	65	25	75	
Bon Air Coal and Iron Co.	Nashville	Eastland 2				8			12			18			3	14	10	30	
Bon Air Coal and Iron Co.	Nashville	Ravenscroft				10			13			19			3	160	35	105	310.00
Clifty Consolidated Coal Co.	Clifty	Clifty Creek 1				7			12			18			3	37	20	60	

Clifty Consolidated Coal Co.	Clifty	Clifty Creek 3				7		12		18		3	72	25	75	135.00
Total fees due the State from all coal mine inspections for 1911																6,455.00
IRON ORE MINE INSPECTIONS, 1911																
CAMPBELL COUNTY																
La Follette Iron Co.	La Follette	Seneca Ore Mine									2	1	18	15	15	15.00
ROANE COUNTY																
Brown Mining Co.	Cardiff	Baker Slope							25			1	65	25	25	
Brown Mining Co.	Cardiff	Cardiff Slope							26			1	50	25	25	
Brown Mining Co.	Cardiff	Carter Slope							26			1	35	20	20	
Brown Mining Co.	Cardiff	Climer Slope							1			1	20	15	15	
Brown Mining Co.	Cardiff	Evans Slope							1			1	25	20	20	
Brown Mining Co.	Cardiff	Patton Slope							26			1	6	5	5	
Brown Mining Co.	Cardiff	Prospect Slope							25			1	12	10	10	
Brown Mining Co.	Cardiff	Wright Slope							1			1	35	20	20	140.00
Total fees due the State from all iron ore mine inspections for 1911																155.00
COPPER MINE INSPECTIONS, 1911																
POLK COUNTY																
Ducktown Sulphur, Copper and Iron Co.	Isabella	East. Tenn.									15	1	27	20	20	
Ducktown Sulphur, Copper and Iron Co.	Isabella	Mary									15	1	80	30	30	50.00
Tennessee Copper Co.	Copperhill	Burra Burra									16	1	313	35	35	
Tennessee Copper Co.	Copperhill	London									16	1	115	35	35	
Tennessee Copper Co.	Copperhill	Polk County									14	1	117	35	35	105.00
Total fees due the State from all copper mine inspections for 1911																155.00
Grand total fees due the State from all mine inspections for 1911																6 765 00

NOTE.—The change in the personnel of the department occurred on June 1st.

COAL MINE OPERATORS, SUPERINTENDENTS AND INSIDE FOREMEN IN TENNESSEE, JANUARY 1, 1912.

This table gives names and post office addresses of all coal mine operators, superintendents, and inside foremen in Tennessee, January 1, 1912, with districts, counties, operators, and name and location of mines, arranged alphabetically.

Names and post office addresses of coal mine operators, superintendents, and inside foremen in Tennessee, January 1, 1912.

	OPERATOR		MINE	SUPT.	FOREMAN
No.	CO., NAME AND P.O.,	No.	CO., NAME AND P.O.	CO., NAME AND P.O.	CO., NAME AND P.O.
	FIRST DISTRICT—BLEDSOE CO.		BLEDSOE CO.	BLEDSOE CO.	BLEDSOE CO.
1	Atpontley Coal Co.	1	Atpontley	C. B. Finley	R. J. Hoge
	Atpontley		Atpontley	Chattanooga	Atpontley
	CUMBERLAND CO.		CUMBERLAND CO.	CUMBERLAND CO.	CUMBERLAND CO.
2	Clear Creek Coal and Lbr. Co.	2	Clear Creek 1	J. L. Barr	W. H. Reeves
	Isoline		Isoline	Isoline	Isoline
	Clear Creek Coal and Lbr. Co.	3	Clear Creek 5	J. L. Barr	W. H. Reeves
	Isoline		Isoline	Isoline	Isoline
3	Fall Creek Collieries	4	Fall Creek	W. M. Price	O. Kindred
	Ozone		Ozone	Ozone	Ozone
	FENTRESS COUNTY		FENTRESS CO.	FENTRESS CO.	FENTRESS CO.
4	Fentress Coal and Coke Co.	5	Wilder 1-2	Jos. Cain	T. Barwick
	Philadelphia, Pa.		Wilder	Wilder	Wilder
	GRUNDY CO.		GRUNDY CO.	GRUNDY CO.	GRUNDY CO.
5	Ferguson and Harrison	6	Ferguson	J. A. Harrison	J. M. Sehorne
	Coalmont		Coalmont	Coalmont	Coalmont
	Sewanee Fuel and Iron Co.	7	Clouse Hill	H. S. Walden	J. M. Sehorne
	Chattanooga		Coalmont	Coalmont	Coalmont
	Sewanee Fuel and Iron Co.	8	Coalmont A	H. S. Walden	J. M. Sehorne
6	Chattanooga		Coalmont	Coalmont	Coalmont
	Sewanee Fuel and Iron Co.	9	Coalmont B	H. S. Walden	J. M. Sehorne
	Chattanooga		Coalmont	Coalmont	Coalmont
	Sewanee Fuel and Iron Co.	10	Coalmont L	H. S. Walden	J. M. Sehorne
	Chattanooga		Coalmont	Coalmont	Coalmont
	Tenn. Consolidated Coal Co.	11	East Fork	R. B. Roberts	W. C. Parsons
	Tracy City		Tracy City	Tracy City	Tracy City
	Tenn. Consolidated Coal Co.	12	Henley	R. B. Roberts	W. Almond
7	Tracy City		Tracy City	Tracy City	Tracy City
	Tenn. Consolidated Coal Co.	13	Ramsey	R. B. Roberts	J. D. Wiley
	Tracy City		Tracy City	Tracy City	Tracy City
	Tenn. Consolidated Coal Co.	14	Reid Hill	R. B. Roberts	W. C. Parsons
	Tracy City		Tracy City	Tracy City	Tracy City
8	W. H. Workman	15	Flat Branch	W. H. Workman	W. S. Orange
	Meeks		Meeks	Meeks	Meeks
	MARION CO.		MARION CO.	MARION CO.	MARION CO.
9	Battle Creek Coal and Coke Co.	16	Battle Creek	F. P. Thompson	W. McIntyre
	Orme		Orme	Orme	Orme
	New Etna Coal Co.	17	Drum Opening	Thos. Degnan	A. H. Stansberry
	Whiteside		Whiteside	Whiteside	Whiteside
	New Etna Coal Co.	18	Mill Creek	Thos. Degnan	A. H. Stansberry
	Whiteside		Whiteside	Whiteside	Whiteside
	New Etna Coal Co.	19	New Etna 1	Thos. Degnan	A. H. Stansberry
	Whiteside		Whiteside	Whiteside	Whiteside
	New Etna Coal Co.	20	New Etna 2	Thos. Degnan	A. H. Stansberry
10	Whiteside		Whiteside	Whiteside	Whiteside
	New Etna Coal Co.	21	New Etna 3	Thos. Degnan	A. H. Stansberry
	Whiteside		Whiteside	Whiteside	Whiteside
	New Etna Coal Co.	22	New Etna 4	Thos. Degnan	A. H. Stansberry
	Whiteside		Whiteside	Whiteside	Whiteside
	New Etna Coal Co.	23	New Etna 5	Thos. Degnan	A. H. Stansberry
	Whiteside		Whiteside	Whiteside	Whiteside
	New Etna Coal Co.	24	New Etna 6	Thos. Degnan	A. H. Stansberry
	Whiteside		Whiteside	Whiteside	Whiteside

Names and post office addresses of coal mine operators, superintendents, and inside foremen in Tennessee, January 1, 1912—continued.

	OPERATOR		MINE	SUPT.	FOREMAN
No.	CO., NAME AND P.O.	No.	CO., NAME AND P.O.	CO., NAME AND P.O.	CO., NAME AND P.O.
	MARION CO. CON.				
11	Tenn. Coal, Iron and R.R. Co. Birmingham, Ala.	25	Whitwell 1 Whitwell	Thos. G. Fear Whitwell	J. W. Smith Whitwell
	Tenn. Coal, Iron and R.R. Co. Birmingham, Ala.	26	Whitwell 5 Whitwell	Thos. G. Fear Whitwell	J. W. Smith Whitwell
12	Tenn. Consolidated Coal Co. Tracy City	27	Pryor Ridge 1 Tracy City	R. B. Roberts Tracy City	S. L. Lowry Tracy City
	Tenn. Consolidated Coal Co. Tracy City	28	Pryor Ridge 2 Tracy City	R. B. Roberts Tracy City	S. L. Lowry Tracy City
	OVERTON CO.		OVERTON CO.	OVERTON CO.	OVERTON CO.
13	Brier Hill Collieries Crawford	29	Brier Hill 1 Crawford	Reese Watkins Crawford	A. H. Davidson Crawford
	Brier Hill Collieries Crawford	30	Brier Hill 2 Crawford	Reese Watkins Crawford	A. H. Davidson Crawford
14	East Fork Coal and Coke Co. Monterey, R.F.D. 3	31	Obey City Obey City	S. A. Booher Monterey R.F.D. 3	D. T. Jenkins Monterey, R.F.D. 3
15	Overton Coal and Coke Co. Cravens	32	Overton Cravens	Irving Allred Allred	W. N. Pope Cravens
16	J. C. Lusk Obey City	33	Peacock Obey City	J. C. Lusk Obey City	J. C. Lusk Obey City
	SEQUATCHIE CO.		SEQUATCHIE CO.	SEQUATCHIE CO.	SEQUATCHIE CO.
17	Chattanooga Iron and Coal Co. Chattanooga	34	Douglas 2 Dunlap	Jno. M. Smith Dunlap	John Dagnan Dunlap
	WHITE CO.		WHITE CO.	WHITE CO.	WHITE CO.
	Bon Air Coal and Iron Co. Nashville	35	Bon Air Shaft Bon Air	J. M. Durrett Bon Air	S. A. Rhinehart Bon Air
	Bon Air Coal and Iron Co. Nashville	36	Bon Air Six Bon Air	J. M. Durrett Bon Air	Geo. Thom, Jr. Bon Air
18	Bon Air Coal and Iron Co. Nashville	37	Eastland 1 Eastland	--- ---	Geo. Thom, Sr. Eastland
	Bon Air Coal and Iron Co. Nashville	38	Eastland 2 Eastland	--- ---	Geo. Thom, Sr. Eastland
	Bon Air Coal and Iron Co. Nashville	39	Ravenscroft Ravenscroft	W. F. Dibrell Bon Air	Wm. Morrow Ravenscroft
19	Clifty Consolidated Coal Co. Clifty	40	Clifty Creek 1 Clifty	C. W. Bell Clifty	Joe Ledford Clifty
	Clifty Consolidated Coal Co. Clifty	41	Clifty Creek 3 Clifty	C. W. Bell Clifty	Joe Ledford Clifty
	SECOND DISTRICT				
	HAMILTON CO.		HAMILTON CO.	HAMILTON CO.	HAMILTON CO.
20	T. A. and W. A. Alexander Daisy	42	Alexander Daisy	T. A. Alexander Daisy	T. A. Alexander Daisy
	Durham Coal and Iron Co. Chattanooga	43	Big Soddy 7 Soddy	J. H. Jones Soddy	J. B. Mansfield Soddy
21	Durham Coal and Iron Co. Chattanooga	44	Sale Creek Sale Creek	J. H. Jones Soddy	R. L. Woods Sale Creek
	Durham Coal and Iron Co. Chattanooga	45	Soddy 1 and 2 Soddy	J. H. Jones Soddy	J. T. Olinger Soddy
	Durham Coal and Iron Co. Chattanooga	46	Soddy 4 Soddy	J. H. Jones Soddy	Robt. Joseph Soddy
22	Keiser-Geismer Eng. Co. Montlake	47	Montlake Montlake	H. F. Geismer Montlake	Joe White Montlake
	MORGAN CO.		MORGAN CO.	MORGAN CO.	MORGAN CO.
23	Baker Mining Co. Coalfield	48	Baker 1 Coalfield	M. F. Hatfield Coalfield	M. F. Hatfield Coalfield
24	Big Brushy Coal and Coke Co. Petros	49	Big Brushy 1-2 Petros	W. S. Wood Petros	W. S. Scarbrough Petros

Names and post office addresses of coal mine operators, superintendents, and inside foremen in Tennessee, January 1, 1912—continued.

	OPERATOR		MINE	SUPT.	FOREMAN
No.	CO., NAME AND P.O.	No.	CO., NAME AND P.O.	CO., NAME AND P.O.	CO., NAME AND P.O.
	MORGAN CO. CON.				
25	Big Mt. Coal Mining Co. Oliver Springs	50	Big Mt. Oliver Springs	Chas. Livingston Knoxville	Squire Broyles Oliver Springs
26	Bottomlee and Fagan Blue Gem	51	Hooper Blue Gem		J. A. Fagan Blue Gem
27	H. B. Bowling Coal Co. Coalfield	52	Bowling 1 Coalfield	J. W. Dean Coalfield	E. M. Taylor Coalfield
28	W. G. Fairchild Sunbright	53	Fairchild Sunbright	W. G. Fairchild Sunbright	W. G. Fairchild Sunbright
29	Harriman Coal Co. Harriman	54	Harriman Little Emory	G. W. Walker Harriman	G. W. Walker Harriman
30	R. H. Jackson Coalfield	55	Jackson Coalfield	R. H. Jackson Coalfield	R. H. Jackson Coalfield
31	Jackson Bros. Oliver Springs	56	Jackson Oliver Springs	Alex Jackson Oliver Springs	Alex Jackson Oliver Springs
32	Little Brushy Coal Co. Atlanta, Ga.	57	Little Brushy Stephens	A. H. Wood Petros	O. R. Joyner Petros
33	Mt. Carbon Coal Co. Oliver Springs	58	Mt. Carbon Oliver Springs	R. P. Walls Oliver Springs	J. J. Walls Oliver Springs
34	Oliver Coal Co. Oliver Springs	59	Oliver Oliver Springs	W. D. Richards Oliver Springs	R. H. McGlothlin Oliver Springs
35	Oliver Springs C. and Clay Co. Oliver Springs	60	Reed Oliver Springs	R. P. Walls Oliver Springs	R. P. Walls Oliver Springs
36	Poplar Creek Coal Co. Oliver Springs	61	Poplar Creek Oliver Springs	J. K. Butler Oliver Springs	
37	Prudential Coal Co. Oliver Springs	62	Prudential Oliver Springs	L. O. Stone Oliver Springs	R. S. Davis Oliver Springs
38	State of Tennessee Nashville RHEA CO.	63	State Mines Petros RHEA CO.	A. W. Evans Petros RHEA CO.	S. H. Jestes Petros RHEA CO.
39	Dayton Coal and Iron Co. Dayton	64	Prospect Dayton	Nash Holden Dayton	J. C. Pressnel Dayton
40	Durham Coal and Iron Co Chattanooga	65	Fox 1 Graysville	J. H. Jones Soddy	S. P. Loggins Graysville
	Durham Coal and Iron Co. Chattanooga	66	Fox 2 Graysville	J. H. Jones Soddy	S. P. Loggins Graysville
41	Penn Coal and Lumber Corp. Spring City ROANE CO.	67	Penn Spring City ROANE CO.	F. H. Enwright Spring City ROANE CO.	R. P. Simpson Spring City ROANE CO.
42	Roane Iron Co. Rockwood	68	McLean Arbutus	J. M. Richards Arbutus	J. M. Richards Arbutus
	Roane Iron Co. Rockwood SCOTT CO.	69	Rockwood Old Rockwood SCOTT CO.	W. J. Richards Rockwood SCOTT CO.	W. T. Richards Rockwood SCOTT CO.
43	Baker Coal and Coke Co. Newland	70	Baker Newland	A. McDonald Harriman	Sam Van Newland
44	George Coffee Laxton	71	Coffee Laxton	George Coffee Laxton	Jas. Buttram Laxton
45	Glen Mary Coal and Coke Co. Glen Mary	72	Glen Mary 1A Glen Mary	Gus Carter Glen Mary	J. M. Carson Glen Mary
	Glen Mary Coal and Coke Co. Glen Mary	73	Glen Mary 3C Glen Mary	Gus Carter Glen Mary	J. M. Carson Glen Mary
	Glen Mary Coal and Coke Co. Glen Mary	74	Glen Mary 4G Glen Mary	Gus Carter Glen Mary	J. M. Carson Glen Mary
46	LeMoyne Mines Isham	75	LeMoyne Isham	J. C. Walker Isham	Jno. Chambers Isham

Names and post office addresses of coal mine operators, superintendents, and inside foremen in Tennessee, January 1, 1912—continued.

	OPERATOR		MINE	SUPT.	FOREMAN
No.	CO., NAME AND P.O.	No.	CO., NAME AND P.O.	CO., NAME AND P.O.	CO., NAME AND P.O.
	SCOTT CO. CON.				
47	Pine Knot Coal Co. Harriman	76	Pine Knot Laxton	A. McDonald Harriman	Jerry Connor Laxton
48	Southern Clay Mfg. Co. Chattanooga	77	Southern Clay Robbins	R. M. Ashby Robbins	J. C. Pemberton Robbins
49	Stanley Coal Co. Harriman	78	Stanley 1 Oneida	A. McDonald Harriman	J. H. Elswick Harriman
	Stanley Coal Co. Harriman	79	Stanley 2 Oneida	A. McDonald Harriman	J. H. Elswick Harriman
50	Terry Coal Co. Oneida	80	Oneida Oneida	A. C. Terry Oneida	A. West Oneida
51	Virginia Mining Co. Roberta	81	Phillips Roberta	J. B. Craig Roberta	A. Laxton Roberta
	Virginia Mining Co. Roberta	82	Rosser Roberta	J. B. Craig Roberta	A. Laxton Roberta
	Virginia Mining Co. Roberta	83	West Hollow Roberta	J. B. Craig Roberta	A. Laxton Roberta
52	R. A. Woods and Co. Oneida	84	Paint Rock 1 Oneida	A. McDonald Harriman	Jas. Buttram Laxton
	R. A. Woods and Co. Oneida	85	Paint Rock 2 Oneida	A. McDonald Harriman	Jas. Buttram Laxton
	R. A. Woods and Co. Oneida	86	Paint Rock 3 Oneida	A. McDonald Harriman	Jas. Buttram Laxton
	THIRD DISTRICT ANDERSON CO.		ANDERSON CO.	ANDERSON CO.	ANDERSON CO.
53	Black Diamond Coal Co. Knoxville	87	Black Diamond 1 Coal Creek	L. F. Card Coal Creek	W. E. Hendrew Coal Creek
	Black Diamond Coal Co. Knoxville	88	Black Diamond 5 Coal Creek	L. F. Card Coal Creek	John Sharp Coal Creek
54	Briceville Coal Co. Briceville	89	Andy's Ridge Briceville		W. R. Keith Briceville
55	Coal Creek Coal Co. Knoxville	90	Fraterville Coal Creek	G. M. Camp Knoxville	W. H. Branscom Coal Creek
	Coal Creek Coal Co. Knoxville	91	Taft Coal Creek	G. M. Camp Knoxville	W. H. Branscom Coal Creek
	Coal Creek Coal Co. Knoxville	92	Thistle Coal Creek	G. M. Camp Knoxville	W. H. Branscom Coal Creek
56	Knoxville Iron Co. Knoxville	93	Cross Mt. 1 Briceville	P. F. Lynch Briceville	Geo. Bulmer Briceville
	Knoxville Iron Co. Knoxville	94	Cross Mt. 3 Briceville	P. F. Lynch Briceville	D. J. Riding Briceville
57	Poplar Creek Coal and Iron Co. Knoxville	95	Piedmont 2 Oliver Springs	W. H. Storrs Knoxville	J. T. Williams Oliver Springs
	Poplar Creek Coal and Iron Co. Knoxville	96	Piedmont 4 Oliver Springs	W. H. Storrs Oliver Springs	J. T. Williams Oliver Springs
58	Minersville Coal Co. Pless	97	Brookside Pless	J. W. Goans Pless	J. Stonecipher Pless
	Minersville Coal Co. Pless	98	Buck Mt. Pless	J. W. Goans Pless	J. Stonecipher Pless
59	Tennessee Coal Co. Briceville	99	Middle Ridge Briceville	E. F. Buffat Briceville	H. H. Braden Briceville
	Tennessee Coal Co. Briceville	100	Tennessee Briceville	E. F. Buffat Briceville	H. H. Braden Briceville
60	Wind Rock Coal and Coke Co. Wind Rock	101	Wind Rock Wind Rock	W. G. Srodes Wind Rock	Tom Doyle Wind Rock
	CAMPBELL CO.		CAMPBELL CO.	CAMPBELL CO.	CAMPBELL CO
61	Anchor Coal Co. Morley	102	Anchor Morley	H. D. Rankin Morley	J. H. Richards Morley

Names and post office addresses of coal mine operators, superintendents, and inside foremen in Tennessee, January 1, 1912—continued.

	OPERATOR		MINE	SUPT.	FOREMAN
No.	CO., NAME AND P.O.	No.	CO., NAME AND P.O.	CO., NAME AND P.O.	CO., NAME AND P.O.
	CAMPBELL CO. CON.				
62	Bear Wallow Coal and Coke Co. Caryville	103	Bear Wallow Caryville	A. H. Bowling Caryville	Ed. Allen Caryville
63	Block Coal and Coke Co. Louisville, Ky.	104	Block 2 Block	Jno. P. Gorman Jellico	W. M. Comer Block
	Block Coal and Coke Co. Louisville, Ky.	105	Block 3 Block	Jno. P. Gorman Jellico	W. M. Comer Block
64	Blue Gem Coal Co. Jellico	106	Blue Gem Jellico	J. F. Macpherson Jellico	Jas. Haywood Jellico
65	Campbell Coal Mining Co. Westbourne	107	Jackson Westbourne	W. A. Yeager Westbourne	Richard Rigler Westbourne
66	Caryville Coal Co. Caryville	108	Caryville Caryville	J. H. McManaman Caryville	J. W. Duncan Caryville
67	Central Blue Gem Coal Co. Jellico	109	Woodward Jellico	C. M. Woodward Jellico	C. M. Woodward Jellico
68	Chaska Coal Co. Knoxville	110	Chaska Chaska	W. M. Sexton Chaska	J. W. Payne Chaska
69	Davis Creek Coal Co. Cupp	111	Davis Creek Cupp	I. Livingston Cupp	I. Livingston Cupp
70	Elk Valley Blue Gem Coal Co. Elk Valley	112	Baird, B. G. Elk Valley	Lewis Baird Elk Valley	Aaron Baird Elk Valley
71	Elk Valley Jellico Coal Co. Elk Valley	113	Elk Valley Elk Valley	D. W. Parrott Elk Valley	E. L. Robinson Elk Valley
72	Evans Coal Co. Jellico	114	Evans Jellico	Jno. Kasee Jellico	Jas. Broyles Jellico
73	Falls Branch Coal Co. Wooldridge	115	Falls Branch Wooldridge	Wm. Dinkelaker Wooldridge	J. W. Howe Wooldridge
	Falls Branch Coal Co. Wooldridge	116	Powhatan Wooldridge	Wm. Dinkelaker Wooldridge	J. W. Howe Wooldridge
74	Jellico Cannel Co. Massillon, O.	117	Jellico Cannel Newcomb	W. H. Jenkins Newcomb	Wm. Buck Newcomb
75	H. M. Jones Coal Co. Jellico	118	Jellico, B. G. Jellico	H. M. Jones Jellico	H. M. Jones Jellico
76	Kimberly Mining and Mfg. Co. Cupp	119	Kimberly Cupp	C. R. Brooks Cupp	A. N. Parris Cupp
77	LaFollette Coal, Iron and Ry. Co. LaFollette	120	Gem Peabody	W. S. Wilson LaFollette	H. D. Huffstettler LaFollette
	LaFollette Coal, Iron and Ry. Co. LaFollette	121	Rex 1 LaFollette	H. Bevan LaFollette	Abe Goings LaFollette
	LaFollette Coal, Iron and Ry. Co. LaFollette	122	Rex 2 LaFollette	Chas. Hoeble LaFollette	Chas. Woods LaFollette
78	Morley Coal Co. Morley	123	Morley Morley	J. C. Krans Knoxville	G. W. Eustter Morley
79	Perkins Branch B. G. Coal Co. Elk Valley	124	Perkins Branch Elk Valley	N. L. Baird Elk Valley	N. L. Baird Elk Valley
80	Proctor Coal Co. Red Ash, Ky.	125	Indian Mt. Jellico	Phil Francis Red Ash, Ky.	J. P. Alred Red Ash, Ky.
81	Red Ash Coal Co. Caryville	129	Red Ash Caryville	T. D. Richards Caryville	D. W. Steadman Caryville
82	Remy Coal Co. Gatliff	127	Remy Gatliff	J D. Wheeler Gatliff	A. S. Lindsay Gatliff
83	Rich Mt. Coal and Coke Co. Bennett	128	Rich Mt. Bennett	H. W. Tillery Bennett	M. S. Elliott Bennett
84	Rock Springs Coal Co. Knoxville	129	Rock Springs Turley	G. W. Card Turley	Paul Card Turley

Names and post office addresses of coal mine operators, superintendents, and inside foremen in Tennessee, January 1, 1912—continued.

	OPERATOR		MINE	SUPERINTENDENT	FOREMAN
No.	CO., NAME AND P.O.	No.	CO., NAME AND P.O.	CO., NAME AND P.O.	CO., NAME AND P.O.
	CAMPBELL CO. CON.				
85	Royal Coal and Coke Co Pless	130	Cambria Coal Creek	W. A. Pless Coal Creek	Chas. Bell Coal Creek
	Royal Coal and Coke Co Pless	131	New Royal Coal Creek	W. A. Pless Coal Creek	Chas. Bell Coal Creek
86	Southern Coal and Coke Co Gatliff	132	Southern Gatliff	A. V. Brown Gatliff	G. W. Pickle Gatliff
87	Sun Coal Co Caryville	133	Pee Wee Caryville	J. H. Bowling Caryville	Warren Card Caryville
	Sun Coal Co Caryville	134	Sun Caryville	J. H. Bowling Caryville	Warren Card Caryville
88	Tenn. Jellico Coal Co Knoxville	135	Tenn. Jellico Anthras	Jno. P. Gorman Jellico	P. F. Gorman, Jr. Anthras
89	Westbourne Coal Co Westbourne	136	Westbourne Westbourne	W. A. Yeager Westbourne	R. T. Boone Westbourne
	Westbourne Coal Co Westbourne	137	White Oak Westbourne	W. A. Yeager Westbourne	R. T. Boone Westbourne
90	I. L. Wilson Newcomb	138	Newcomb, B. G Newcomb	Jno. H. Wilson Newcomb	Jno. H. Wilson Newcomb
91	Wooldridge-Jellico Coal Co Wooldridge	139	Marion-Anna Wooldridge	Wm. Dinkelaker Wooldridge	T. H. Griffith Wooldridge
	Wooldridge-Jellico Coal Co Wooldridge	140	Wooldridge Wooldridge	Wm. Dinkelaker Wooldridge	T. H. Griffith Wooldridge
92	Wynn Coal Co Gatliff	141	Wynn Gatliff	Harry Wynn Gatliff	W. H. Keyes Gatliff
93	Peter Zechini Newcomb	142	Italian, B. G Newcomb	Thos. Zechini Newcomb	W. A. Braden Newcomb
94	Zechini Coal Co Newcomb	143	Zechini Newcomb	Thos. Zechini Newcomb	Jos. Graef Newcomb
	CLAIBORNE CO.		CLAIBORNE CO.	CLAIBORNE CO.	CLAIBORNE CO.
95	Bryson Mt. Coal and Coke Co Hartranft	144	Bryson Mt. 1 Hartranft	A. L. Adam Hartranft	Jules Brown Hartranft
	Bryson Mt. Coal and Coke Co Hartranft	145	Bryson Mt. 2 Hartranft	A. L. Adam Hartranft	Jules Brown Hartranft
96	Campbell Coal Mining Co Eagan	146	Buffalo Eagan	J. H. Reynolds Eagan	Riley Parrott Eagan
97	Fork Ridge Coal and Coke Co Fork Ridge	147	Fork Ridge 1-2 Fork Ridge	A. H. Rennebaum Fork Ridge	C. H. Farmer Fork Ridge
	Fork Ridge Coal and Coke Co Fork Ridge	148	Fork Ridge 3 Fork Ridge	A. H. Rennebaum Fork Ridge	C. H. Farmer Fork Ridge
	Fork Ridge Coal and Coke Co Fork Ridge	149	Fork Ridge 4 Fork Ridge	A. H. Rennebaum Fork Ridge	John Lewis Fork Ridge
98	King Mt. Coal Co Clairfield	150	King Mt Clairfield	H. J. Fallon Clairfield	H. J. Fallon Clairfield
99	Mingo Coal and Coke Co Hartranft	151	Mingo 5 Hartranft	Z. T. Ralston Hartranft	John Minton Hartranft
100	Nicholson Coal Mining Co Fork Ridge	152	Nicholson 2 Nicholson	E. R. Short Fork Ridge	A. E. Davidson Fork Ridge
	Nicholson Coal Mining Co Fork Ridge	153	Nicholson 3 Nicholson	E. R. Short Fork Ridge	A. E. Davidson Fork Ridge
101	Pruden Coal and Coke Co Knoxville	154	Pruden Pruden	G. M. Wallen Pruden	Rufe Speaks Pruden
102	Reliance Coal and Coke Co Hartranft	155	Reliance 1-2 Hartranft	J. B. Robinson Hartranft	Geo. L. Bell Hartranft
	Reliance Coal and Coke Co Hartranft	156	Reliance 3 Hartranft	J. B. Robinson Hartranft	Geo. L. Bell Hartranft

Coal Mine Operators, Superintendents and Inside Foremen in Tennessee—continued.

	OPERATOR		MINE	SUPT.	FOREMAN
No.	CO., NAME AND P.O.	No.	CO., NAME AND P.O.	CO., NAME AND P.O.	CO., NAME AND P.O.
	CLAIBORNE CO. CON.				
103	Standard Jellico Coal Co. Knoxville	157	Standard Clairfield	L. R. Eager Clairfield	S. C. Craig Clairfield
104	Sterling Coal and Coke Co. Manring	158	Sterling 1-2 Manring	C. B. Finley, Jr. Manring	W. T. Robinson Manring
105	Yellow Creek Coal Co. Middlesboro, Ky.	159	Yellow Creek 2 Bosworth, Ky.	Geo. Veal Bosworth, Ky.	Dan Wallbrecht Bosworth, Ky.
	Yellow Creek Coal Co. Middlesboro, Ky.	160	Yellow Creek 3 Bosworth, Ky.	Geo. Veal Bosworth, Ky.	Dan Wallbrecht Bosworth, Ky.

MINES.

The following mines shown in the 1910 report are now combined, or changed in name, and are now reported as follows:

Name of Mine as shown in report of 1910		Name and number under which mine is now reported in 1911.	
County and Name	No.	County and Name	Post Office
Bledsoe County		Bledsoe County	
Atpontley 2 Atpontley 6	1	Atpontley	Atpontley
Fentress County		Fentress County	
Fentress 1 Fentress 2	5	Wilder 1-2	Wilder
Grundy County		Grundy County	
Hampton	10	Coalmont L	Coalmont
East Staub Nunley Ramsey 1 Ramsey West Street Hill Werner	13	Ramsey	Tracy City
Marion County		Marion County	
Thomas 1-2	25	Whitwell 1	Whitwell
Thomas 5	26	Whitwell 5	Whitwell
Hamilton County		Hamilton County	
Big Soddy A Big Soddy B Big Soddy 1 Big Soddy 2 Big Soddy 3 Big Soddy 4	43	Big Soddy 7	Soddy
Soddy 5 Soddy 9 Soddy 10	46	Soddy 4	Soddy
Morgan County		Morgan County	
Prudential 1 Prudential 2	62	Prudential	Oliver Springs
Brushy Mt. 1 Brushy Mt. 3	63	State Mines	Petros
Rhea County		Rhea County	
Fox 3	66	Fox 2	Graysville
Scott County		Scott County	
Glen Mary 2	72	Glen Mary 1A	Glen Mary
Glen Mary 4	73	Glen Mary 3C	Glen Mary
Glen Mary 5	74	Glen Mary 4G	Glen Mary
Stanley	78	Stanley 1	Oneida
Campbell County		Campbell County	
Blue Gem Speed	108	Blue Gem	Jellico
Chaska 1 Chaska 3	110	Chaska	Chaska
Davis Creek 1 Davis Creek 2	111	Davis Creek	Cupp
Indian Mt. 1 Indian Mt. 2	125	Indian Mt.	Jellico
Southern 1 Southern 2	132	Southern	Gatliff
Westbourne 1-2 Westbourne 3	136	Westbourne	Westbourne
Claiborne County		Claiborne County	
Fork Ridge 1-F Fork Ridge 2-S	147	Fork Ridge 1-2	Fork Ridge
Mingo 1 Mingo 2 Mingo 3	151	Mingo 5	Hartranft

The following mines shown in the 1910 report are now worked out and abandoned, or closed indefinitely.

Name of operator, and name of mine and post office address.

Operator and County	Name	Post Office
Cumberland County	Cumberland County	
Renfro Coal and Coke Co.	Renfro	Ozone
Waldensia Coal and Coke Co.	Waldensia	Waldensia
Morgan County	Morgan County	
Emory River Coal Co.	Babahatchie	Oakdale
J. A. Fagan	Fagan	Blue Gem
J. W. Fritts	Fritts	Oliver Springs
Rhea County	Rhea County	
Dayton Coal and Iron Co.	Richland	Dayton
Roane County	Roane County	
B. A. Treat	Treat	Harriman
Scott County	Scott County	
Scott County Coal Co.	Lehigh 5	Helenwood
Scott County Coal Co.	Lehigh 6	Helenwood
W. H. Workman	Workman	Meeks
Anderson County	Anderson County	
Black Diamond Coal Co.	Black Diamond 6	Coal Creek
Mirersville Coal Co	Eureka	Pleas
Campbell County	Campbell County	
Big Block Coal Co.	Big Block	Cupp
Elk Hart B. G. Coal Co.	Elk Hart B. G.	Elk Valley
Italy Coal Co.	Italy	Jellico
A. T. Newman	Newman	Jellico
Whistle Creek Jellico Coal Co.	Whistle Creek	Newcomb
Claiborne County	Claiborne County	
New Jellico Coal Co.	New Jellico	Clairfield

COAL SEAMS.

This table gives the name, thickness, and analysis of each coal seam worked in Tennessee in 1911, together with the names of the operating companies.

Name, thickness, elevation, and analysis of coal seams worked in Tennessee in 1911, and the coal production of each mine.

OPERATOR / COUNTY AND MINE	Product 1911 Short Tons	SEAM WORKED: NAME	SEAM WORKED: Elevation above Sea Level (feet)	SEAM WORKED: Thickness (Inches)	ANALYSIS: Fixed Carbon (Per Cent)	ANALYSIS: Volatile Matter (Per Cent.)	ANALYSIS: Ash (Per Cent.)	ANALYSIS: Moisture (Per Cent.)	ANALYSIS: Sulphur (Per Cent.)
	41	80	81	82	68	69	70	71	72
ANDERSON COUNTY									
Black Diamond Coal Co.	152,861	Coal Creek	1,025	44	63.15	29.78	2.65	2.35	0.19
Briceville Coal Co.	944	Coal Creek	------	------	------	------	------	------	------
Coal Creek Coal Co.									
Fraterville Mine	88,655	Coal Creek	960	48	57.29	36.65	5.50	0.56	1.03
Taft Mine		Coal Creek	1,025	60	57.29	36.65	5.50	0.56	1.03
Thistle Mine		Coal Creek	1,010	48	55.55	40.00	3.10	1.35	0.63
Knoxville Iron Co.	122,463	Coal Creek	1,005	48	56.01	36.57	6.65	0.77	1.08
Poplar Creek Coal and Iron Co.	13,897	Coal Creek	1,000	48	57.52	38.82	2.67	0.99	0.89
Minersville Coal Co.	78,130	Coal Creek	1,000	42	60.17	35.54	2.40	1.29	0.60
Tennessee Coal Co.	95,875	Coal Creek	975	48	63.42	31.47	3.34	1.34	0.43
Wind Rock Coal and Coke Co.	187,912	Dean	2,400	57	53.64	42.00	4.36	1.90	0.59
BLEDSOE COUNTY									
Atpontley Coal Co.	26,150	Sewanee	1,300	30	63.57	28.17	7.10	1.16	1.15
CAMPBELL COUNTY									
Anchor Coal Co.	15,416	White Oak 1 and2	1,373	72	------	------	------	------	------
Bear Wallow Coal and Coke Co.	19,740	Coal Creek	1,050	42	58.09	38.92	1.60	1.49	0.60
Block Coal and Coke Co.	49,800	Block	2,360	38	50.77	46.53	1.43	1.27	------
Blue Gem Coal Co.	51,000	Blue Gem	1,000	26	51.27	44.79	1.24	2.70	0.90
Campbell Coal Mining Co.	105,140	Log Mountain	1,100	48	------	------	------	------	------
Caryville Coal Co.	60,387	Red Ash	2,445	45	60.87	35.29	1.68	1.55	0.61
Chaska Coal Co.	49,837	Rich Mountain	1,400	40	54.40	37.14	6.45	2.07	2.67
Davis Creek Coal Co.	12,469	Jellico	1,975	40	53.43	40.66	0.54	0.57	2.23
Elk Valley Blue Gem Coal Co.	1,630	Blue Gem	1,250	20	59.50	39.50	1.10	2.10	0.96
Elk Valley Jellico Coal Co.	18,600	Splint	1,600	36	------	------	------	------	------
Evans Coal Co.	13,530	Blue Gem	1,200	24	------	------	------	------	------
Falls Branch Coal Co.									
Falls Branch Mine	74,654	Jellico	1,250	40	60.60	35.44	1.60	2.36	------
Powhatan Mine		Blue Gem	1,160	24	------	------	------	------	------
Jellico Cannel Coal Co.	8,048	Jellico	1,800	36	------	------	------	------	------
Jones, H. M., Coal Co.	1,400	Blue Gem	1,200	24	55.71	40.54	1.09	2.65	------
Kimberly Mining and Mfg. Co.	53,396	Rich Mountain	1,555	38	------	------	------	------	------
LaFollette Coal, Iron and Railway Co.									
Gem Mine	421,862	Jordan	1,986	50	56.25	41.36	1.72	0.67	0.65
Rex No. 1		Rex	1,180	40	56.28	40.26	3.46	2.50	1.21
Rex No. 2		Rex	1,270	36	56.28	40.26	3.46	2.50	1.21
Proctor Coal Co.	67,535	Jellico	1,300	40	61.02	36.50	2.00	0.48	------
Red Ash Coal Co.	73,531	Red Ash	2,450	42	28.52	37.72	1.74	2.02	------
Remy Coal Co.	44,250	Rich Mountain	1,578	36	54.24	42.64	1.42	1.70	0.65
Rich Mountain Coal and Coke Co.	36,660	Rich Mountain	1,270	34	53.47	40.84	4.99	0.70	1.97
Rock Springs Coal Co.	3,135	Dean	2,800	52	------	------	------	------	------
Royal Coal and Coke Co.	31,290	Coal Creek	1,080	40	60.17	35.54	2.40	1.29	0.60
Southern Coal and Coke Co.	115,748	Jordan	1,800	54	59.25	36.32	2.13	2.30	1.07
Sun Coal Co.	72,470	Block	2,429	42	------	------	------	------	------
Tennessee Jellico Coal Co.	71,830	Jellico	1,400	52	------	------	------	------	------

Name, thickness, elevation, and analysis of coal seams worked in Tennessee in 1911, and the coal production of each mine—continued.

OPERATOR	Product 1911 Short Tons	Seam Worked			Analysis				
County and Mine		Name	Elevation above Sea Level (feet)	Thickness (Inches)	Fixed Carbon (Per Cent)	Volatile Matter (Per Cent.)	Ash (Per Cent.)	Moisture (Per Cent.)	Sulphur (Per Cent.)
41		80	81	82	68	69	70	71	72
Campbell County, Con.									
Westbourne Coal Co.	116,882	Log Mountain	1,100	43	56.25	41.36	1.72	0.67	0.78
Wilson, I. L.	682	Blue Gem	1,200	26	------	------	------	------	------
Woodward, C M.	3,901	Blue Gem	1,200	24	------	------	------	------	------
Woolridge Jellico Coal Co.	61,167	Jellico	1,200	36-42	60.60	35.44	1.60	2.36	------
Wynn Coal Co.	25,100	Rich Mountain	1,200	34	53.15	41.71	2.75	2.39	0.73
Zechini Coal Co.	18 990	Jellico	1,275	34	------	------	------	------	------
Zechini, Peter	12,106	Blue Gem	1,200	22	------	------	------	------	------
Claiborne County									
Bryson Mountain Coal and Coke Co.	113,521	Mingo	1,755	60	60.87	34.63	2.43	1.63	0.44
Campbell Coal Mining Co.	70,635	Remy	1,425	36	55.66	40.82	1.72	1.80	0.56
Fork Ridge Coal and Coke Co. No. 1 and 2	341,685	Mingo	1,700	54	59.83	37.19	1.40	0.88	0.70
Fork Ridge Coal and Coke Co. No. 3		Lower Hignite	2,500	44	64.00	30.40	2.60	2.40	0.60
Fork Ridge Coal and Coke No. 4		Sterling	2,300	52	------	------	------	------	------
King Mountain Coal Co.	36,000	Jellico	1,256	41	58.30	38.93	1.25	1.52	0.71
Mingo Coal and Coke Co.	63,165	Mingo	2,250	52	------	------	------	------	------
Nicholson Coal Mining Co. No. 2	38,122	Sandstone	1,800	60	60.51	34.50	4.99	------	0.75
Nicholson Coal Mining Co. No. 3	214,000	Nicholson	2,030	60	55.10	36.30	6.30	1.20	1.10
Pruden Coal and Coke Co.		Mingo	1,700	60	57.98	38.82	1.60	1.60	0.72
Reliance Coal and Coke Co.	54,094	Mingo	1,600	60	57.95	40.40	1.35	0.30	------
Standard Jellico Coal Co.	22,887	Jellico	1,240	38	63.43	31.80	1.70	0.83	2.24
Sterling Coal and Coke Co.	242,375	Sterling	2,300	60	55.36	38.72	4.06	1.86	0.95
Yellow Creek Coal Co. No. 2	88,000	Jack Rock	2,275	48	60.51	34.50	4.99	1.50	0.50
Yellow Creek Coal No. 3		Poplar Lick	2,425	54	60.51	34.50	4.99	1.50	0.72
Cumberland County									
Clear Creek Coal and Lumber Co.	28,852	Isoline	1,900	33	53.86	42.20	2.21	1.73	1.47
Fentress County									
Fentress Coal and Coke Co.	111,683	Bon Air 2	1,600	54	52.73	34.72	9.08	3.46	2.42
Grundy County									
Ferguson and Harrison	3,450	Sewanee	1,900	24	59.83	31.32	6.65	1.30	0.85
Sewanee Fuel and Iron Co.	102,031	Sewanee	1,916	40	59.88	31.32	7.50	1.30	0.85
Tennessee Consolidated Coal Co.									
East Fork Mine	140,447	Sewanee	1,900	42	------	------	------	------	------
Henley Mine		Sewanee	1,935	36	------	------	------	------	------
Ramsey Mine		Sewanee	1,860	42	57.73	32.66	8.35	1.26	0.64
Reid Hill Mine		Sewanee	1,919	42	56.82	32.73	9.43	1.02	0.76
Workman, W. H.	11,156	Sewanee	1,900	34	------	------	------	------	------
Hamilton County									
Alexander, T. A. and W. A.	3,419	No. 10	1,625	42	------	------	------	------	------
Durham Coal and Iron Co.									
Big Soddy No. 7 Mine	278,495	Soddy No. 7	1,200	32	65.45	26.04	7.48	1.02	0.64
Sale Creek Mine		Nelson No. 2	875	42	60.29	31.27	7.02	1.42	0.60
Soddy No. 1 and 2 Mine		Soddy No. 7	1,268	27	60.85	29.18	7.16	2.10	0.71
Soddy No. 4 Mine		Soddy No. 7	1,440	32	60.85	29.18	7.16	2.10	0.71
Montlake Coal Co.	49,337	No. 10	1,650	36	61.34	28.33	8.75	0.64	1.27
Marion County									
Battle Creek Coal and Coke Co.	94,110	Battle Creek	1,550	60	58.77	32.44	6.12	1.50	1.17
New Etna Coal Co.	47,860	Kelly	1,690	32	73.92	21.90	2.45	1.02	0.71
Tennessee Coal, Iron and R.R. Co.	301,772	Sewanee	1,800	40	61.57	28.14	8.39	1.90	0.90
Tennessee Consolidated Coal Co.	73,963	Sewanee	1,841	48	60.13	29.89	8.65	0.77	0.56
Tennessee River Coal Co.	275	Battle Creek	1,600	50	------	------	------	------	------

Name, thickness, elevation, and analysis of coal seams worked in Tennessee in 1911, and the coal production of each mine—continued.

OPERATOR / County and Mine	Product 1911 Short Tons	Seam Worked: Name	Seam Worked: Elevation above Sea Level (feet)	Seam Worked: Thickness (Inches)	Analysis: Fixed Carbon (Per Cent)	Analysis: Volatile Matter (Per Cent.)	Analysis: Ash (Per Cent.)	Analysis: Moisture (Per Cent.)	Analysis: Sulphur (Per Cent.)
	41	80	81	82	68	69	70	71	72
Morgan County									
Baker Mining Co.	16,938	Coal Creek	1,000	54	55.72	40.89	2.12	0.80	1.10
Big Brushy Coal and Coke Co.	40,460	Brushy Mt.	1,620	40	62.32	32.32	5.37	.....	0.81
Big Mountain Coal Mining Co.	12,100	Coal Creek	2,000	48	.....	.....	.....	.....	.....
Bottomlee and Fagan	510	Blue Gem	.....	.....	.....	.....	.....	.....	.....
Bowling Coal Co.	51,540	Coal Creek	1,000	48	55.70	40.39	2.02	0.79	1.10
Fairchild, W. G.	136	Glen Mary	1,480	18	.....	.....	.....	.....	.....
Harriman Coal Co.	4,772	Jellico	1,100	31	57.36	38.13	3.53	.....	0.65
Jackson Bros.	1,000	Coal Creek	1,100	40	.....	.....	.....	.....	.....
Little Brushy Coal Co.	6,437	Brushy Mt.	1,675	36	.....	.....	.....	.....	.....
Mount Carbon Coal Co.	1,080	Mount Carbon	1,400	48	.....	.....	.....	.....	.....
Oliver Coal Co.	3,820	Coal Creek	800	48	50.71	44.81	2.15	0.25	2.08
Oliver Springs Coal and Clay Co.	700	Coal Creek	950	32	.....	.....	.....	.....	.....
Prudential Coal Co.	30,950	Coal Creek	1,200	48	.....	.....	.....	.....	.....
State of Tennessee	284,397	Brushy Mt.	1,620	34	62.31	32.32	5.37	.....	0.81
Overton County									
Brier Hill Collieries	66,569	Bon Air No. 2	1,700	37	62.54	30.85	5.44	1.09	1.56
Obey City Coal Co.	2,938	Bon Air No. 2	1,600	35	53.90	38.98	5.60	1.52	1.83
Overton Coal and Coke Co.	6,570	Bon Air No. 2	1,645	60	.....	.....	.....	.....	.....
Peacock Coal and Coke Co.	3,060	Bon Air No. 2	1,700	34	.....	.....	.....	.....	.....
Rhea County									
Dayton Coal and Iron Co.	130,746	Richland	985	22	51.82	31.15	16.63	.....	1.50
Durham Coal and Iron Co No. 1	1,493	Nelson No. 2	950	60	60.57	34.23	3.77	1.43	0.51
Durham Coal and Iron Co. No. 2	17,397	Richland No. 5	1,250	30	60.24	28.97	9.45	1.34	0.82
Penn Coal and Lumber Corp.	800	.....	1,800	36	55.37	30.33	13.21	1.09	1.37
Roane County									
Roane Iron Co.	185,802	Sewanee	1,080	48	58.72	31.15	9.98	2.50	0.55
Scott County									
Baker Coal and Coke Co.	6,000	Dean	1,450	32	.....	.....	.....	.....	.....
Coffee, George	300	Paint Rock	1,250	28	.....	.....	.....	.....	.....
Glen Mary Coal and Coke Co.	40,696	No. 4	1,490	27	61.63	36.73	1.64	.....	0.29
LeMoyne Mines	4,387	No. 4	1,200	30	50.20	43.81	4.71	1.28	.....
Pine Knot Coal Co.	4,359	Paint Rock	1,340	28	.....	.....	.....	.....	.....
Southern Clay Mfg. Co.	8,496	Glen Mary No. 4	1,400	22	.....	.....	.....	.....	.....
Stanley Coal Co.	14,210	Paint Rock	1,300	30	.....	.....	.....	.....	.....
Terry Coal Co.	6,200	Paint Rock	1,400	32	57.00	36.75	3.25	2.00	0.60
Virginia Mining Co.	42,966	Glen Mary No. 4	1,400	30	56.88	36.78	4.32	1.32	1.32
Woods, R. A. and Co.	5,100	No. 5	1,300	27	.....	.....	.....	.....	.....
Sequatchie County									
Chattanooga Iron and Coal Co., Rec.	86,147	Sewanee	1,667	48	58.36	29.72	11.92	.....	1.44
White County									
Bon Air Coal and Iron Co.									
Bon Air Mines	66,124	Bon Air	1,800	36	57.50	33.00	7.50	.....	2.00
Eastland Mines	51,030	Sewanee	1,800	48	.....	.....	.....	.....	.....
Ravenscroft	114,879	Ravenscroft	1,879	54	57.00	37.00	4.90	.....	1.10
Clifty Consolidated Coal Co.	121,708	Sewanee	1,600	38-42	.....	.....	.....	.....	.....

EMPLOYES, WAGES PAID AND DAYS ACTIVE.

This table gives the average number of employes in and about the coal mines of Tennessee, and the nature of their employment by counties and districts for 1911; also average number of days active and total amount of wages received by employes.

Employes in and around Tennessee coal mines in 1911; *also total amount paid for labor and total number of days active.*

Counties and Districts	Underground Workers							Outside Workers				Grand total Workers Inside and Outside	Total Amount Paid for Labor	Av No. of Days Active
	Pick Miners	Haulage Men	Foremen	Machine Miners	Mch. Run. and Helpers	Others Inside	Total Inside	Blacksmiths	Timber Men	Others Outside	Total Outside			
	1	2	3	4	5	6	7	8	9	10	11	12	25-36	44
First District:														
Bledsoe	40	6	1	....	....	1	48	1	1	6	8	56	.....	180
Cumberland	31	5	1	....	....	2	39	1	1	11	13	52	.....	203
Fentress	75	8	2	12	2	14	113	1	1	13	15	128	.....	244
Grundy	382	40	6	....	....	4	432	7	3	18	28	460	.....	197
Marion	533	75	13	9	11	87	728	10	11	129	150	878	.....	225
Overton	105	14	4	....	....	7	130	3	2	11	16	146	.....	158
Sequatchie	90	20	2	....	....	8	120	1	1	25	27	147	.....	276
White	228	56	7	83	74	100	548	12	11	87	110	658	.....	238
Total	1,484	224	36	104	87	223	2,158	36	31	300	367	2,525	$1,237,232	209
Second District:														
Hamilton	345	65	8	....	....	93	509	9	10	65	84	593	.....	220
Morgan	497	79	19	41	17	77	730	8	20	61	89	a819	.....	164
Rhea	201	59	9	....	....	22	291	4	4	80	88	379	.....	165
Roane	132	30	4	....	....	75	241	2	5	32	39	280	.....	283
Scott	202	28	10	50	12	24	326	4	6	51	61	387	.....	165
Total	1,377	261	48	91	29	291	2,097	27	45	289	361	2,458	929,427	180
Third District:														
Anderson	568	137	19	167	30	71	992	13	32	125	170	1,162	.....	212
Campbell	1,655	303	41	338	119	182	2,638	41	76	303	420	3,058	.....	214
Claiborne	782	223	21	104	82	177	1,389	18	37	178	233	1,622	.....	218
Total	3,005	663	81	609	231	430	5,019	72	145	606	823	5,824	2,833,842	214
Grand Total	5,866	1,148	165	804	347	944	9,274	135	221	1,195	1,557	10,825	$5,000,501	203

a—Of this number 428 were at the State mines at Petros.

WAGES PER DAY PAID EMPLOYES.

This table gives the average wages per day paid to employes in and about the coal mines of Tennessee for 1911.

Average wages paid per day to employes of Tennessee Coal Mines in 1911.

Counties and Districts	Underground Workers							Outside Workers				Grand Total Workers Inside and Outside
	Pick Miners	Haulage Men	Foremen	Machine Miners	Machine Runners and Helpers	Others Inside	Total Inside	Blacksmiths	Timber Men	Others Outside	Total Outside	
	13	14	15	16	17	18	19	20	21	22	23	24
First District												
Bledsoe												
Cumberland												
Fentress												
Grundy												
Marion												
Overton												
Sequatchie												
White												
Total	$ 2.53	$ 1.82	$ 3.78	$ 1.83	$ 3.02	$ 1.66	$ 2.38	$ 2.08	$ 2.23	$ 2.16	$ 2.16	$ 2.34
Second District												
Hamilton												
Morgan												
Rhea												
Roane												
Scott												
Total	$ 2.81	$ 2.26	$ 3.60	$ 2.55	$ 2.35	$ 2.27	$ 2.66	$ 2.45	$ 2.50	$ 2.10	$ 2.17	$ 2.59
Third District												
Anderson												
Campbell												
Claiborne												
Total	$ 2.35	$ 2.04	$ 4.77	$ 2.20	$ 2.40	$ 2.02	$ 2.31	$ 2.46	$ 2.20	$ 1.93	$ 2.03	$ 2.27
Grand Total	$ 2.51	$ 2.06	$ 4.27	$ 2.25	$ 2.65	$ 1.99	$ 2.41	$ 2.39	$ 2.29	$ 2.04	$ 2.11	$ 2.37

AMOUNT PAID EMPLOYES.

The following table gives the amount paid to each class of coal employes in Tennessee for 1911 by districts.

Amount paid each class of coal employes in Tennessee in 1911 by districts.

Kind of Employes	First District		Second District		Third District		Total	
	Total Amount Paid	Per Cent of Total Cost	Total Amount Paid	Per Cent of Total Cost	Total Amount Paid	Per Cent of Total Cost	Total Amount Paid	Per Cent of Total Cost
Pick Miners	$ 785,894	63.52	$ 547,774	58.94	$1,513,519	53.41	$ 2,847,187	56.94
Haulage Men	85,170	6.88	85,247	9.17	289,346	10.22	460,051	9.20
Foremen	28,430	2.30	26,798	2.88	82,654	2.92	137,882	2.76
Machine Miners	39,850	3.22	41,801	4.42	286,311	10.10	367,322	7.34
Machine runners and helpers	54,976	4.44	9,548	1.03	118,739	4.19	183,263	3.66
Others inside	77,168	6.24	96,961	10.43	186,182	6.57	360,311	7.21
Total inside	$ 1,071,488	86.60	$ 807,409	86.87	$ 2,477,119	87.41	$ 4,356,016	87.11
Blacksmiths	$ 15,623	1.26	$ 10,428	1.12	$ 37,903	1 34	$ 63,954	1.28
Timbermen	14,423	1.17	15,509	1.67	68,223	2.41	98,155	1.96
Others outside	135,698	10.97	96,081	10.34	250,597	8.84	482,376	9.65
Total outside	$ 165,744	13.40	$ 122,018	13.13	$ 356,723	12.59	$ 644,485	12.89
Grand total inside and outside	$ 1,237,232	100.00	$ 929,427	100.00	$ 2,833,842	100.00	$ 5,000,501	100.00

PRODUCTION AND VALUE OF COAL.

This table gives the coal product of Tennessee coal mines for 1911, together with the disposition of the product and the average value per ton obtained.

Coal product and values, disposition of product and average value per ton obtained in 1911.

COUNTY	Coal Product (Short Tons)					Coal Values	
	Loaded for Shipment	Used for Fuel and Steam	Sold Local Trade and Employes	Coked	Total Product	Total Value	Average Value per Ton
	37	38	39	40	41	42	43
Anderson	721,354	12,597	6,786	----------	740,737	$ 661,357	$ .89
Bledsoe	26,000	100	50	----------	26,150	28,765	1.10
Campbell	1,656,451	48,416	19,919	----------	1,724,786	2,005,234	1.16
Claiborne	1,256,694	25,629	2,561	----------	1,284,884	1,282,063	1.00
Cumberland	27,903	713	236	----------	28,852	35,165	1.22
Fentress	108,745	2,682	256	----------	111,683	119,617	1.07
Grundy	236,528	785	635	19,136	257,084	282,287	1.10
Hamilton	260,779	2,216	6,830	61,426	331,251	376,140	1.14
Marion	505,706	8,196	4,078	----------	517,980	664,484	1.28
Morgan	350,100	11,206	2,428	91,106	a454,840	a473,228	1.04
Overton	77,681	1,156	300	----------	79,137	83,411	1.05
Rhea	13,870	8,119	1,540	126,907	150,436	199,794	1.33
Roane	----------	21,481	3,901	160,420	185,802	216,923	1.17
Scott	119,915	11,945	854	----------	132,714	165,903	1.25
Sequatchie	82,208	3,294	645	----------	86,147	94,077	1.09
White	334,952	16,217	2,572	----------	353,741	382,928	1.08
Total	5,778,886	174,752	53,591	458,995	6,466,224	$ 7,071,376	$ 1.09

a—The product of the State operations at Brushy Mountain Mines at Petros amounted to 284,397 short tons valued at $295,773, or $1.04 per ton. The product of Morgan County excluding the operations of the State mines, amounted to 170,443 short tons, valued at $177,455, or $1.04 per ton.

PRODUCT AND VALUE OF COAL IN 1911 COMPARED WITH 1910.

This table gives the product with the value thereof and the value per ton of coal mined in Tennessee by counties and districts for 1911 as compared with 1910.

Coal product in Tennessee in 1911, *as compared with* 1910.

COUNTIES AND DISTRICTS	1911			1910			Increase (+) or Decrease (—) 1911	
	Product (Short Tons)	Value (Dollars)	Value per Ton	Product (Short Tons)	Value (Dollars)	Value per Ton	Product (Short Tons)	Value (Dollars)
First District:								
Bledsoe	26,150	$ 28,765	$ 1.10	28,000	$ 30,800	$ 1.10	— 1,850	—$ 2,035
Cumberland	28,852	35,165	1.22	49,980	56,375	1.13	— 21,128	— 21,210
Fentress	111,683	119,617	1.07	99,037	106,557	1.09	+ 12,646	+ 12,760
Grundy	257,084	282,287	1.10	357,210	393,212	1.10	—100,126	—110,925
Marion	517,980	664,484	1.28	547,916	692,421	1.26	— 29,936	— 27,937
Overton	79,137	83,411	1.05	78,335	77,791	1.00	+ 802	+ 5,620
Sequatchie	86,147	94,077	1.09	84,186	93,445	1.11	+ 1,961	+ 632
White	353,741	382,928	1.08	362,832	392,728	1.08	— 9,091	— 9,800
Total	1,460,774	$ 1,690,734	$ 1.16	1,607,496	$ 1,843,629	$ 1.14	—146,722	—$ 152,895
Second District:								
Hamilton	331,251	$ 376,140	$ 1.14	278,119	$ 320,975	$ 1.15	+ 53,132	+$55,165
Morgan	454,840	473,228	1.04	505,046	482,180	.96	— 50,206	— 8,952
Rhea	150,436	199,794	1.33	148,896	208,976	1.40	+ 1,540	— 9,182
Roane	185,802	216,923	1.17	194,399	234,035	1.20	— 8,597	— 17,112
Scott	132,714	165,903	1.25	132,677	158,986	1.20	+ 37	+ 6,917
Total	1,255,043	$ 1,431,988	$ 1.14	1,259,137	$ 1,405,152	$ 1.11	— 4,094	+$26,836
Third District:								
Anderson	740,737	$ 661,357	$ .89	802,074	$ 834,149	$ 1.04	— 61,337	—$172,792
Campbell	1,724,786	2,005,234	1.16	1,716,565	2,016,181	1.17	+ 8,221	— 10,947
Claiborne	1,284,884	1,282,063	1.00	1,523,416	1,527,729	1.00	—238,532	—245,666
Total	3,750,407	$ 3,948,654	$ 1.05	4,042,055	$ 4,378,059	$ 1.08	—291,648	—$429,405
Grand Total	6,466,224	$ 7,071,376	$ 1.09	6,908,688	$ 7,626,840	$ 1.10	—442,464	—$555,464

RECAPITULATION.

DISTRICT	Increase in 1911		Decrease in 1911	
	Product (Short Tons)	Value	Product (Short Tons)	Value
First			146,722	$ 152,895
Second		$ 26,836	4,094	
Third			291,648	429,405
Total		$ 26,836	442,464	$ 582,300
Total Increases				$ 26,836
Total Decreases			442,464	$ 582,300
Net Decrease			—442,464	—$555,464

PRODUCTION OF COAL IN TENNESSEE 1840-1911.

The following statement shows coal production of Tennessee from earliest times, 1840 to close of 1911, and coal values of Tennessee from 1873 to 1911, inclusive.

Coal product and values of Tennessee, 1840 to 1911, inclusive.

YEAR	Product (Short tons)	Value (Dollars)	Value per ton	YEAR	Product (Short tons)	Value (Dollars)	Value per ton
1840*	558			1876	550,000	$ 605,000	$ 1.10
1841	600			1877	450,000	495,000	1.10
1842	1,000			1878	375,000	412,000	1.10
1843	4,500			1879	496,131	545,744	1.10
1844	10,000			1880	641,042	769,250	1.20
1845	18,000			1881	750,000	900,000	1.20
1846	25,000			1882	850,000	1,020,000	1.20
1847	30,000			1883	1,000,000	1,150,000	1.15
1848	40,000			1884	1,200,000	1,380,000	1.15
1849	52,000			1885	1,440,957	1,585,052	1.10
1850	60,000			1886	1,714,290	1,885,719	1.10
1851	70,000			1887	1,900,000	2,090,000	1.10
1852	75,000			1888	1,967,297	2,164,026	1.10
1853	85,000			1889	1,925,689	2,338,309	1.21
1854	90,000			1890	2,169,585	2,386,543	1.10
1855	100,000			1891	2,404,484	2,655,045	1.10
1856	115,000			1892	2,332,677	2,635,924	1.13
1857	125,000			1893	1,902,258	2,048,449	1.08
1858	135,000			1894	2,180,879	2,119,481	0.97
1859	150,000			1895	2,319,720	2,157,340	0.93
1860*	165,300			1896	2,663,714	2,251,064	0.86
1861	150,000			1897	2,880,994	2,316,239	0.81
1862	140,000			1898	3,084,748	2,340,346	0.77
1863	100,000			1899	3,736,134	3,287,797	0.88
1864	100,000			1900	3,904,048	4,294,928	1.10
1865	100,000			1901	3,785,672	4,115,974	1.09
1866	100,000			1902	4,232,332	5,278,921	1.25
1867	110,000			1903	4,810,758	6,173,724	1.28
1868	125,000			1904	4,847,242	5,617,095	1.16
1869	130,000			1905	5,552,576	6,496,865	1.17
1870*	133,418			1906	6,272,457	7,565,286	1.20
1871	180,000			1907	6,940,911	8,482,899	1.22
1872	224,000			1908	6,082,851	6,961,393	1.14
1873	350,000	$ 385,000	$ 1.10	1909	6,207,483	6,757,824	1.09
1874	350,000	385,000	1.10	1910	6,908,688	7,626,840	1.10
1875	360,000	396,000	1.10	1911	6,466,224	7,071,376	1.09

*U. S. census (fiscal report). All other data from 1841 to 1872, inclusive, obtained from U. S. Geological Survey (fiscal report).

RANK OF COUNTIES IN THE PRODUCTION OF COAL.

This table gives the rank of the counties that produce coal, first with reference to quantity of product, and then with reference to value of product together with the percentage of the total coal product of the State contributed by each county.

Relative rank of coal-producing counties in Tennessee in 1911, *with amount and value of product, and percentage of each.*

Rank	COUNTY	Amount of Product (Short Tons)	Per cent of Total Product	Rank	COUNTY	Value of Product	Per cent of Total Product
1	Campbell	1,724,786	26.67	1	Campbell	$ 2,005,234	28.36
2	Claiborne	1,284,884	19.87	2	Claiborne	1,286,063	18.13
3	Anderson	740,737	11.46	3	Marion	664,484	9.40
4	Marion	517,980	8.01	4	Anderson	661,357	9.35
5	Morgan	454,840	7.03	5	Morgan	473,228	6.69
6	White	353,741	5.47	6	White	382,928	5.41
7	Hamilton	331,251	5.12	7	Hamilton	376,140	5.32
8	Grundy	257,084	3.98	8	Grundy	282,287	3.99
9	Roane	185,802	2.87	9	Roane	216,923	3.07
10	Rhea	150,436	2.33	10	Rhea	199,794	2.82
11	Scott	132,714	2.05	11	Scott	165,903	2.35
12	Fentress	111,683	1.73	12	Fentress	119,617	1.69
13	Sequatchie	86,147	1.33	13	Sequatchie	94,077	1.33
14	Overton	79,137	1.22	14	Overton	83,411	1.18
15	Cumberland	28,852	.45	15	Cumberland	35,165	.50
16	Bledsoe	26,150	.41	16	Bledsoe	28,765	.41
	Total	6,466,224	100.00		Total	$ 7,071,376	100.00

RANK OF COAL PRODUCING COUNTIES, 1891-1911.

The following table shows relative rank of coal-producing counties in Tennessee from 1891 to 1911, inclusive.

Relative rank of coal-producing counties from 1891 to 1911.

COUNTY	YEAR.																				
	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911
Anderson	1	1	1	1	2	1	1	1	1	1	1	1	3	3	3	3	3	3	3	3	3
Bledsoe	---	---	---	---	---	---	---	---	---	---	---	14	15	15	15	16	16	14	16	16	16
Campbell	6	3	3	4	4	2	2	2	3	2	2	3	2	2	1	1	1	1	1	1	1
Claiborne	11	6	5	5	5	6	6	5	4	4	3	2	1	1	2	2	2	2	2	2	2
Cumberland	14	14	14	14	14	13	13	13	13	12	12	11	10	10	14	14	14	15	13	15	15
Fentress	---	---	---	---	---	---	---	---	---	---	---	---	---	14	12	12	13	10	12	12	12
Franklin	12	12	12	12	13	14	14	14	15	15	---	---	---	---	---	---	---	---	---	---	---
Grundy	2	2	2	2	1	3	3	6	5	5	6	5	6	6	6	6	5	5	6	7	8
Hamilton	4	8	7	6	6	9	7	9	7	8	7	6	7	7	8	8	8	12	8	8	7
Marion	3	4	4	3	3	4	4	4	6	6	5	7	5	5	5	7	7	6	4	4	4
Morgan	8	11	10	11	11	5	5	3	2	3	4	4	4	4	4	4	4	4	5	5	5
Overton	---	---	---	---	---	---	---	---	---	---	15	15	13	13	13	13	15	13	14	14	14
Putnam	13	13	13	13	12	12	12	12	12	13	13	---	---	---	---	---	17	16	---	---	---
Rhea	5	7	9	8	10	11	10	7	8	7	9	8	8	8	9	9	9	9	11	10	10
Roane	9	9	11	9	9	8	8	10	9	10	10	10	11	11	10	11	11	8	9	9	9
Scott	7	5	6	7	7	7	11	11	11	11	11	12	12	12	11	10	10	11	10	11	11
Sequatchie	---	---	---	---	---	---	---	---	14	14	14	13	14	16	16	15	12	---	15	13	13
White	10	10	8	10	8	10	9	8	10	9	8	9	9	9	7	5	6	7	7	6	6

It will be observed from this table that Anderson County, with the exception of the year 1895, maintained the lead from 1891 to 1902, inclusive, when it was assumed and held by the county of Claiborne for two years. It was then assumed and is now held by the county of Campbell, with Claiborne ranking second and Anderson third.

As compared with 1910, Hamilton County has captured seventh position from Grundy.

Rank of coal-producing States in 1909 *and* 1910, *with quantity and value of product and percentage of each.*

1909

Production				Value			
Rank	State or Territory	Quantity (Short Tons)	Percentage of total production	Rank	State or Territory	Value	Percentage of total value
1	Pennsylvania:			1	Pennsylvania:		
	Anthracite	81,070,359	17.6		Anthracite	$149,181,587	26.9
	Bituminous	137,966,791	29.9		Bituminous	130,085,237	23.4
2	West Virginia	51,849,220	11.2	2	Illinois	53,522,014	9.6
3	Illinois	50,904,990	11.0	3	West Virginia	44,661,716	8.1
4	Ohio	27,939,641	6.1	4	Ohio	27,789,010	5.0
5	Indiana	14,934,259	3.2	5	Alabama	16,306,236	2.9
6	Alabama	13,703,450	3.0	6	Indiana	15,154,681	2.7
7	Colorado	10,716,936	2.3	7	Colorado	14,296,012	2.6
8	Kentucky	10,697,384	2.3	8	Iowa	12,793,628	2.3
9	Iowa	7,757,762	1.7	9	Kansas	10,083,384	1.8
10	Kansas	6,986,478	1.5	10	Kentucky	10,079,917	1.8
11	Wyoming	6,393,109	1.4	11	Wyoming	9,896,848	1.8
12	Tennessee	6,358,645	1.4	12	Washington	9,158,999	1.7
13	Virginia	4,752,217	1.0	13	Tennessee	6,920,564	1.2
14	Maryland	4,023,241	.9	14	Oklahoma	6,253,367	1.1
15	Missouri	3,756,530	.8	15	Missouri	6,183,626	1.1
16	Washington	3,602,263	.8	16	Montana	5,036,942	.9
17	Oklahoma	3,119,377	.7	17	Maryland	4,471,731	.8
18	New Mexico	2,801,128	.6	18	Virginia	4,251,056	.8
19	Montana	2,553,940	.6	19	Utah	3,751,310	.7
20	Arkansas	2,377,157	.5	20	New Mexico	3,619,744	.7
21	Utah	2,266,899	.5	21	Arkansas	3,523,189	.6
22	Texas	1,824,440	.4	22	Michigan	3,199,351	.6
23	Michigan	1,784,692	.4	23	Texas	3,141,945	.6
24	North Dakota	422,047	.1	24	North Dakota	645,142	.1
25	Georgia	211,196	.1	25	Georgia	298,792	.1
26	Oregon	57,276		26	Oregon	235,085	.1
27	California and Alaska	48,636		27	California and Alaska	107,342	
28	Idaho	4,553		28	Idaho	19,459	
	Total	460,814,616	100.0		Total	$ 554,668,364	100.0

1910

Production				Value			
Rank	State or Territory	Quantity (Short Tons)	Percentage of total production	Rank	State or Territory	Value	Percentage of total value
1	Pennsylvania:			1	Pennsylvania:		
	Anthracite	84,485,236	16.8		Anthracite	$ 160,275,302	25.5
	Bituminous	150,521,526	30.00		Bituminous	153,029,510	24.3
2	West Virginia	61,671,019	12.3	2	West Virginia	56,665,061	9.0
3	Illinois	45,900,246	9.1	3	Illinois	52,405,897	8.3
4	Ohio	34,209,668	6.8	4	Ohio	35,932,288	5.7
5	Indiana	18,389,815	3.7	5	Indiana	20,813,659	3.3
6	Alabama	16,111,462	3.2	6	Alabama	20,236,853	3.2
7	Kentucky	14,623,319	2.9	7	Colorado	17,026,934	2.7
8	Colorado	11,973,736	2.4	8	Kentucky	14,405,887	2.3
9	Iowa	7,928,120	1.6	9	Iowa	13,903,913	2.2
10	Wyoming	7,533,088	1.5	10	Wyoming	11,706,187	1.9
11	Tennessee	7,121,380	1.4	11	Washington	9,764,465	1.5
12	Virginia	6,507,997	1.3	12	Tennessee	7,925,350	1.3
13	Maryland	5,217,125	1.0	13	Kansas	7,914,709	1.3
14	Kansas	4,921,451	1.0	14	Virginia	5,877,486	.9
15	Washington	3,911,899	.8	15	Oklahoma	5 867,947	.9
16	New Mexico	3,508,321	.7	16	Maryland	5,835,058	.9
17	Missouri	2,982,433	.6	17	Montana	5 329,322	.8
18	Montana	2,920,970	.6	18	Missouri	5,328,285	.8
19	Oklahoma	2,646,226	.5	19	New Mexico	4,877,151	.8
20	Utah	2,517,809	.5	20	Utah	4,224,556	.7
21	Arkansas	1,905,958	.4	21	Texas	3,160,965	.5
22	Texas	1,892,176	.4	22	Arkansas	2,979,213	.5
23	Michigan	1,534,967	.3	23	Michigan	2,930,771	.5
24	North Dakota	399,041	.1	24	North Dakota	595,139	.1
25	Georgia	177,245	.1	25	Georgia	259,122	.1
26	Oregon	67,533		26	Oregon	235,229	
27	California and Alaska	12,164		27	California and Alaska	33,336	
28	Idaho	4,448		28	Idaho	17,426	
	Total	501,596,378	100.0		Total	$ 629,557,021	100.0

It will be observed that Tennessee moved from rank 12 in 1909 to rank 11 in 1910.

Quantity and value of coal produced in the United States in 1910 *in short tons.*

State or Territory	1910		Increase (+) or decrease (−), 1910		Percentage of increase or decrease, 1910	
	Quantity	Value	Quantity	Value	Quantity	Value
Alabama	16,111,462	$ 20,236,853	+ 2,408,012	+$3,930,617	+17.57	+$24.10
Arkansas	1,905,958	2,979,213	— 471,199	— 543,926	—19.82	—15.44
California and Alaska	12,164	33,336	— 36,472	— 74,006	—74.99	—68.94
Colorado	11,973,736	17,026,934	+ 1,256,800	+ 2,730,922	+11.73	+19.10
Georgia	177,245	259,122	— 33,951	— 39,670	—16.08	—13.28
Idaho	4,448	17,426	— 105	— 2,033	— 2.31	— 1.04
Illinois	45,900,246	52,405,897	— 5,004,744	— 1,116,117	— 9.83	— 2.09
Indiana	18,389,815	20,813,659	+ 3,555,556	+ 5,658,978	+23.97	+37.34
Iowa	7,928,120	13,903,913	+ 170,358	+ 1,110,285	+ 2.20	+ 8.68
Kansas	4,921,451	7,914,709	— 2,065,027	— 2,168,675	—29.56	—21.51
Kentucky	14,623,319	14,405,887	+ 3,925,935	+ 4,325,970	+36.70	+42.92
Maryland	5,217,125	5,835,058	+ 1,193,884	+ 1,363,327	+29.67	+30.49
Michigan	1,534,967	2,930,771	— 249,725	— 268,580	—13.99	— 8.39
Missouri	2,982,433	5,328,285	— 774,097	— 855,341	—20.61	—13.83
Montana	2,920,970	5,329,322	+ 367,030	+ 292,380	+14.37	+ 5.80
New Mexico	3,508,321	4,877,151	+ 707,193	+ 1,257,407	+25.25	+34.74
North Dakota	399,041	595,139	— 23,006	— 50,003	— 5.45	— 7.75
Ohio	34,209,668	35,932,288	+ 6,270,027	+ 8,143,278	+22.44	+29.30
Oklahoma	2,646,226	5,867,947	— 473,151	— 385,420	—15.17	— 6.16
Oregon	67,533	235,229	— 19,743	+ 144	— 2.62	+ .06
Pennsylvania bituminous	150,521,526	153,029,510	+12,554,735	+22,944,273	+ 9.10	+17.64
Tennessee	7,121,380	7,925,350	+ 762,735	+ 1,004,786	+12.00	+14.52
Texas	1,892,176	3,160,965	+ 67,736	+ 19,020	+ 3.71	+ .60
Utah	2,517,809	4,224,556	+ 250,910	+ 472,746	+11.07	+12.60
Virginia	6,507,997	5,877,486	+ 1,755,780	+ 1,626,430	+36.95	+38.26
Washington	3,911,899	9,764,465	+ 309,636	+ 605,466	+ 8.60	+ 6.61
West Virginia	61,671,019	56,665,061	+ 9,821,799	+12,003,345	+18.94	+26.88
Wyoming	7,533,088	11,706,187	+ 1,139,979	+ 1,809,339	+17.83	+18.28
Total bituminous	417,111,142	$ 469,281,719	+37,366,885	+63,794,942	+ 9.84	+15.73
Pennsylvania anthracite	84,485,236	160,275,302	+ 3,414,877	+11,093,715	+ 4.21	+ 7.44
Grand Total	501,596,378	$ 629,557,021	+40,781,762	+74,888,657	+ 8.85	+13.50

WORLD'S PRODUCTION OF COAL.

In the following table a statement is presented showing the coal production of the principal countries of the world in the years nearest to that under review for which the figures are obtainable. For the sake of convenience the quantities are expressed in the measurement customary in each country and are reduced for comparison to short tons of 2,000 pounds.

The world's production of coal.

COUNTRIES	Usual unit in producing country.	Equivalent in short tons
United States (1910)	long tons	447,853,909	501,596,378
Great Britain (1910)	do	264,292,588	296,007,699
Germany (1910)	metric tons	222,301,660	245,043,120
Austria-Hungary (1909)	do	49,509,016	54,573,788
France (1910)	do	38,570,473	42,516,232
Belgium (1910)	do	23,927,230	26,374,986
Russia and Finland (1910)	do	22.650,000	24,967,095
Japan (1909)	do	14,973,617	16,505,418
Canada (1910)	short tons	12,796,512	12,796,512
China (1909)	metric tons	12,000,000	13,227,600
India (1909)	long tons	11,870,114	13,294,528
New South Wales (1909)	do	7,019,879	7,862,264
Spain (1909)	metric tons	4,124,751	4,546,713
Transvaal (1910)	long tons	3,970,069	4,446,477
Natal (1910)	do	2,296,439	2,572,012
New Zealand (1909)	do	1,911,247	2,140,597
Mexico (1909)	metric tons	1,300,000	1,432,990
Holland (1909)	do	1,120,852	1,235,515
Queensland and Victoria *a*	long tons	999,739	1,119,708
Italy (1909)	metric tons	555,073	611,857
Sweden (1909)	do	246,808	272,056
Cape Colony (1909)	long tons	92,428	103,519
Tasmania (1909)	do	83,790	93,845
Other Countries *b*	do	4,675,806	5,236,903
Total			1,278,577,812
Percentage of the United States			39.2

a Queensland figures are for 1910; Victoria, 1909.

b Includes Turkey, Servia, Portugal, Chile, Borneo, Peru, Greece, etc.

The amount (in short tons) of coal produced in the United States has increased from 460,814,616 tons in 1909 to 501,596,378 tons in 1910, an increase of 40,781,762 tons.

The percentage of the world's coal produced by the United States in 1909 was 37.5 per cent; in 1910 it was 39.2 per cent.

Statistics of labor strikes in the coal mines of the United States in 1909 and 1910.

STATE OR TERRITORY	1909			1910		
	Number of men on strike	Total days lost	Average number of days lost per man	Number of men on strike	Total days lost	Average number of days lost per man
Alabama				25	1,250	50
Arkansas	1,443	41,836	29	4,873	713,210	146
Colorado	55	1,250	23	2,044	195,558	96
Georgia				270	2,970	11
Illinois	2,335	90,720	38	67,218	9,133,953	136
Indiana	36	720	20	12,638	423,894	34
Iowa	2,036	12,504	6	9,209	408,563	44
Kansas	4,715	71,566	15	10,346	1,578,027	153
Kentucky	275	16,500	60	1,475	15,197	10
Maryland	25	175	7			
Michigan	527	23,002	44	1,663	86,789	52
Missouri	957	6,593	7	7,774	1,218,599	157
Montana	110	1,100	10	345	38,260	111
North Dakota	75	525	7			
Ohio	2,375	139,434	59	24,746	1,334,631	54
Oklahoma	1,576	11,368	7	8,213	1,247,828	152
Pennsylvania	5,824	260,381	45	60,098	2,700,746	45
Tennessee	277	9,295	34			
Texas	80	4,800	60	1,776	108,230	61
Washington	123	2,300	19	101	303	3
West Virginia	1,919	29,565	15	1,630	13,985	9
Wyoming				1,196	12,792	11
Total bituminous	24,763	723,634	29	215,640	19,234,785	89
Pennsylvania anthractie	771	8,016	10	2,853	15,739	6

DRAFT ANIMALS, EXPLOSIVES AND MINE CARS.

This table gives the number of draft animals employed in coal mining in Tennessee in 1911; also the amount and kind of explosives and the number of mine cars used.

Draft animals, explosives, and mine cars used in Tennessee coal mines in 1911.

Counties and Districts	Draft Animals			Explosives Used			Mine Cars in Use
	Inside	Outside	Total	Powder (Kegs)	Permissible (Pounds)	Dynamite (Pounds)	
	45	46	47	48	49	50	51
First District:							
Bledsoe	6	2	8	650			90
Cumberland	5	2	7	1,594		138	52
Fentress		2	2	4,356	100		209
Grundy	76	8	84	6,077		50	346
Marion	56	20	76	8,091	58,920	20,656	1,247
Overton	9		9	6,124		500	182
Sequatchie	15	4	19	1,679		95	175
White	51	14	65	9,249		7,112	526
Total	218	52	270	37,820	59,020	28,551	2,827
Second District:							
Hamilton	74	16	90	1,468		22,328	771
Morgan	53	9	62	3,725		25,729	1,059
Rhea	41	8	49	2,840	42,544	5,043	403
Roane	45	5	50	3,267	11,136	500	425
Scott	33	6	39	7,242		5,820	633
Total	246	44	290	31,692	53,680	59,420	3,291
Third District:							
Anderson	100	39	139	4,257	400	24,708	1,783
Campbell	197	53	250	31,411	10,021	23,377	4,682
Claiborne	124	26	150	6,647	4,000	30,658	1,186
Total	421	118	539	42,315	14,421	78,743	7,651
Grand total	885	214	1,099	111,827	127,121	166,714	13,769

It may be noted that the amount of permissibles reported in 1909 was 105,477 pounds, while the amount reported in 1910, as shown by this table, was 127,121 pounds.

MINING MACHINES IN USE AND IMPROVEMENTS.

This table gives the number and the make of mining machines in use in Tennessee in 1911, together with the quantity of coal mined by machines, and the cost of improvements for the year.

Mining machines, coal mined with machines, and improvements in Tennessee coal mines in 1911.

County and District	Mining Machines in Use, Make and Number											Coal Mined with Machines	Improvements Made		
	Pick					Chain Breast							Inside	Outside	Total
	Harrison	Ingersoll-Sargent	Sullivan	Other Kinds	Total Pick	Jeffrey-Electric	Sullivan	Goodman	Morgan-Gardner	Total Ch. Breast	Other Kinds	Grand Total Mch.			
	52	53	54	55	56	57	58	59	60	61	61a	62	63	64	65	66
First District															
Bledsoe															
Cumberland															
Fentress						1			1	2		2	4,575			
Grundy															
Marion		7			7							7	42,100	1,025	7,362	8,387
Overton															600	600
Sequatchie															
White		21	2		23			4		4	4	31	146,073			
Total		28	2		30	1		4	1	6	4	40	192,748	1,025	7,962	8,987
Second District															
Hamilton														6,000	124,500	130,500
Morgan	1	13	1		15	3	3	1		7		22	46,076	4,250	9,200	13,450
Rhea														2,500	7,500	10,000
Roane														5,500	3,000	8,500
Scott						2	2	1	2	7		7	42,966	8,340	6,125	14,465
Total	1	13	1		15	5	5	2	2	14		29	89,042	26,590	150,325	176,915
Third District:															
Anderson		7	7	1	15	6	2	2		10		25	195,713	6,000	18,200	24,200
Campbell	23	40	8		71	3	10	4	8	25	4	100	326,648	71,325	101,275	172,600
Claiborne	7	17	2		26	2	8	3		13		39	271,527	1,500	32,900	34,400
Total	30	64	17	1	112	11	20	9	8	48	4	164	793,898	78,825	152,375	231,200
Grand total	31	105	20	1	157	17	25	15	11	68	8	233	1,075,678	106,440	310,662	417,102

STATISTICS IN DETAIL ON COAL.

The following figures give brief statistics in detail as to coal in Tennessee in 1911:

EMPLOYES:		
Average number inside	9,274	
Average number outside	1,195	
Total average number of employes in and around mines		10,826
Total amount paid for labor		$5,000,501
Average wages paid per day		2.37
Total average number of days active		203
PRODUCT (short tons):		
First District	1,460,774	
Second District	1,255,043	
Third District	3,750,407	
Total Product		6,466,224
VALUE OF PRODUCT:		
First District	$1,690,734	
Second District	1,431,988	
Third District	3,948,654	
Total value of product		$7,071,376
Average value per ton of product		1.09
Net decrease in product as compared with 1910 (short tons)		442,464
Net decrease in value as compared with 1910		$555,464
DRAFT ANIMALS EMPLOYED:		
Inside	885	
Outside	214	
Total number of draft animals		1,099
EXPLOSIVES USED:		
Powder (number of kegs)		111,827
Permissible explosives (number of pounds)		127,121
Dynamite (number of pounds)		166,714
Mine cars in use		13,769
MINING MACHINES IN USE:		
Pick	157	
Chain Breast	68	
Other kind	8	
Total number of mining machines in use		233
Quantity of coal mined with machines (short tons)		1,075,678
IMPROVEMENTS MADE:		
Value of inside improvements	106,440	
Value of outside improvements	310,662	
Total value of all improvements made		417,102
ACCIDENTS, NUMBER OF:		
Fatal		111
Non-fatal		198
Total number of children rendered fatherless		154
Total number of wives made widows		72

FATAL ACCIDENTS.

This table shows fatal accidents in Tennessee coal mines in 1911, arranged alphabetically by counties and mines, giving name and occupation of person killed, experience in mining, and cause of accident.

Fatal accidents in Tennessee coal mines in 1911, *by counties and mines.*

Name of County and Mine	Name of Person Killed	Date of Accident	Occupation	Experience	Married or Single	No. of Children	Cause of Accident
ANDERSON COUNTY							
Cross Mt. 1	John Allen, Jr.	Dec. 9	Miner	5 years	M		Explosion
Cross Mt. 1	Eugene Ault	Dec. 9	Driver	2 years	S		Explosion
Cross Mt. 1	Taylor Ault	Dec. 9	Haulage	6 mos.	M		Explosion
Cross Mt. 1	Henry Burton	Dec. 9	Driver	4 years	S		Explosion
Cross Mt. 1	Harry Cannon	Dec. 9	Miner	5 years	M		Explosion
Cross Mt. 1	James Carden	Dec. 9	Miner	5 years	M	1	Explosion
Cross Mt. 1	J. K. Cooper	Dec. 9	Miner	3 years	M	2	Explosion
Cross Mt. 1	John Duff	Dec. 9	Miner	3 years	M	1	Explosion
Cross Mt. 1	F. A. Duff	Dec. 9	Miner	4 mos.	S		Explosion
Cross Mt. 1	Aaron Duncan	Dec. 9	Miner	4 mos.	M	3	Explosion
Cross Mt. 1	E. F. Duncan	Dec. 9	Miner	4 mos.	M	4	Explosion
Cross Mt. 1	Isaac Duncan	Dec. 9	Miner	2 years	M	1	Explosion
Cross Mt. 1	Ernest Elliott	Dec. 9	Haulage	6 mos.	S		Explosion
Cross Mt. 1	Joe Farmer	Dec. 9	Miner	5 years	M	3	Explosion
Cross Mt. 1	W. A. Farmer	Dec. 9	Foreman	5 years	M	2	Explosion
Cross Mt. 1	James Foust	Dec. 9	Miner	15 years	M	5	Explosion
Cross Mt. 1	Ben Gallagher	Dec. 9	Miner	1 year	M		Explosion
Cross Mt. 1	James Galbreath	Dec. 9	Miner	5 mos.	M	1	Explosion
Cross Mt. 1	Wm. Gammon	Dec. 9	Miner	3 mos.	M	2	Explosion
Cross Mt. 1	Reuben Gaylor	Dec. 9	Miner	6 years	M	2	Explosion
Cross Mt. 1	Condy Harmon	Dec. 9	Trackman	2 years	S		Explosion
Cross Mt. 1	P. A. Hatmaker	Dec. 9	Miner	2 mos.	M	2	Explosion
Cross Mt. 1	A. L. Haynes	Dec. 9	Miner	1 year	M	6	Explosion
Cross Mt. 1	J. F. Haynes	Dec. 9	Miner	3 mos.	M	1	Explosion
Cross Mt. 1	Charley Hill	Dec. 9	Driver	1 year	S		Explosion
Cross Mt. 1	Robert Hunter	Dec. 9	Trackman	2 mos.	M		Explosion
Cross Mt. 1	Sil Hutson	Dec. 9	Miner	6 years	M	6	Explosion
Cross Mt. 1	Wm. Irick	Dec. 9	Miner	1 year	M	2	Explosion
Cross Mt. 1	H. A. Irish	Dec. 9	Contractor	8 years	M		Explosion
Cross Mt. 1	Andrew Johnson	Dec. 9	Motorman	1 year	M	1	Explosion
Cross Mt. 1	C. F. Kesterson	Dec. 9	Haulage	1 year	M		Explosion
Cross Mt. 1	T. A. Leatherwood	Dec. 9	Miner	4 mos.	M	3	Explosion
Cross Mt. 1	French Leinart	Dec. 9	Miner	2 years	M	4	Explosion
Cross Mt. 1	A. J. Lester	Dec. 9	Miner	1 mo.	M	5	Explosion
Cross Mt. 1	Elisha Long	Dec. 9	Miner	5 mos.	M		Explosion
Cross Mt. 1	Melvin McKany	Dec. 9	Miner	6 mos.	M		Explosion
Cross Mt. 1	J. E. McQueen	Dec. 9	Miner	4 mos.	M	1	Explosion
Cross Mt. 1	Richard McQueen	Dec. 9	Driver	6 mos.	S		Explosion
Cross Mt. 1	Charlie Marline	Dec. 9	Miner	4 mos.	S		Explosion
Cross Mt. 1	James Marline	Dec. 9	Miner	2 years	M	1	Explosion
Cross Mt. 1	Mike Marlow	Dec. 9	Miner	2 years	S		Explosion
Cross Mt. 1	Thomas Marlow	Dec. 9	Miner	2 years	M	3	Explosion
Cross Mt. 1	John Marshall	Dec. 9	Trackman	3 mos.	M	1	Explosion
Cross Mt. 1	Alonso Martin	Dec. 9	Miner	3 mos.	M	2	Explosion
Cross Mt. 1	Don Martin	Dec. 9	Miner	3 years	M	1	Explosion
Cross Mt. 1	Harvey Martin	Dec. 9	Miner	5 years	M	3	Explosion
Cross Mt. 1	Tom Martin	Dec. 9	Miner	5 years	M	4	Explosion
Cross Mt. 1	Emmet Miller	Dec. 9	Miner	2 years	S		Explosion
Cross Mt. 1	Sam Miller	Dec. 9		5 years	M	5	Explosion
Cross Mt. 1	C. E. Olvey	Dec. 9	Miner	5 years	S		Explosion
Cross Mt. 1	Oscar Olvey	Dec. 9	Miner	5 years	S		Explosion
Cross Mt. 1	Coster Payne	Dec. 9	Miner	1 mo.	S		Explosion
Cross Mt. 1	Eugene Peters	Dec. 9	Motorman	1 year	M	1	Explosion

Fatal accidents in Tennessee coal mines in 1911, *by counties and mines—continued.*

Name of County and Mine	Name of Person Killed	Date of Accident	Occupation	Experience	Married or Single	No. of Children	Cause of Accident
Cross Mt. 1	Ray Peters	Dec. 9	Miner	4 mos.	S		Explosion
Cross Mt. 1	J. S. Peterson	Dec. 9	Miner	2 years	M	1	Explosion
Cross Mt. 1	Lawrence Peterson	Dec. 9	Miner	2 years	S		Explosion
Cross Mt. 1	Dan Phillips	Dec. 9	Machine Run.	5 years	M	4	Explosion
Cross Mt. 1	Lee Polson	Dec. 9	Trackman	1 year	M	2	Explosion
Cross Mt. 1	Durwin Prior	Dec. 9	Driver	5 years	S		Explosion
Cross Mt. 1	Francis Ridenour	Dec. 9	Miner	6 mos.	M	2	Explosion
Cross Mt. 1	Joe Ridenour	Dec. 9	Miner	3 mos.	M	2	Explosion
Cross Mt. 1	Ed. Riseden	Dec. 9	Miner	2 years	M	1	Explosion
Cross Mt. 1	Jas. Robbins	Dec. 9	Miner	10 years	M	4	Explosion
Cross Mt. 1	Dave Robbins	Dec. 9	Miner	5 years	S		Explosion
Cross Mt. 1	Ewen Robbins	Dec. 9		5 years	S		Explosion
Cross Mt. 1	Albert Rowland	Dec. 9	Motorman	6 mos.	M	2	Explosion
Cross Mt. 1	W. P. Rowland	Dec. 9	Motorman	2 years	S		Explosion
Cross Mt. 1	Herman Sharp	Dec. 9	Trapper	1 mo.	S		Explosion
Cross Mt. 1	Robert Sharp	Dec. 9	Driver	2 years	S		Explosion
Cross Mt. 1	Geo. Slover	Dec. 9	Miner	4 years	M	1	Explosion
Cross Mt. 1	Arthur Smith	Dec. 9	Miner	6 mos.	S		Explosion
Cross Mt. 1	W. L. Teno	Dec. 9	Miner	4 mos.	M	2	Explosion
Cross Mt. 1	T. F. Thomas	Dec. 9	Machine Boss	6 years	M		Explosion
Cross Mt. 1	Monroe Vandergriff	Dec. 9	Miner	2 years	M	1	Explosion
Cross Mt. 1	Pat Valloylay	Dec. 9	Miner	1 year	M	4	Explosion
Cross Mt. 1	Tate Valloylay	Dec. 9	Miner	1 year	M	2	Explosion
Cross Mt. 1	Charles White	Dec. 9	Miner	2 years	S		Explosion
Cross Mt. 1	John White	Dec. 9	Mch. Helper	6 mos.	M	4	Explosion
Cross Mt. 1	James A. White	Dec. 9	Miner	1 year	M	2	Explosion
Cross Mt. 1	Noah White	Dec. 9	Miner	1 year	M	3	Explosion
Cross Mt. 1	Charles White	Dec. 9	Miner	1 mo.	M		Explosion
Cross Mt. 1	Alonzo Wood	Dec. 9	Miner	1 year	S		Explosion
Cross Mt. 1	Luther Wood	Dec. 9	Miner	1 year	M	5	Explosion
Cross Mt. 1	Lynn Wood	Dec. 9	Trackman	1 year	S		Explosion
Windrock No. 1	Sam Brashears	Sept. 29	Miner	3 years	S		Fall of slate
Windrock No. 1	Virgil Henry	Nov. 30	Machine	2 mos.	S		Electricity
Campbell County							
Block 2	Garfield Boshears	Feb. 16	Miner	2 mos.	M		Fall of roof
Block 2	J. M. Meadows	May 31	Miner	2 years	M	1	Electricity
Blue Gem	S. B. Elliott	April 24	Miner	30 years	M	5	Fall of slate
Elk Valley	Beaty Hembree	June 21	Miner	4 mos.	M	2	Fall of rock
Gem	Albert Gurley	Dec. 27	Coupler	1 year	S		Motor car
Gem	Louis Madden	July 31	Motorman	4 years	M	3	Motor car
Gem	James Wilson	Dec. 9	Coupler	6 mos.	S		Motor car
Rex 1	Charles Moore	Mar. 18	Miner	4 years	M		Mine car
Sun	George Lester	March 14	Miner		S		Lighted shot
Westbourne	Arch Dickerson	Sept. 1	Miner	10 years	M	4	Fall of slate
Claiborne County							
Fork Ridge	Fount Redmond	June 22	Miner	1 mo.	M	4	Fall of slate
Pruden	Jess Martin	Oct. 2	Miner	5 days	S		Fall of slate
Sterling 1-2	Maynard Douglas	June 30	Motorman	1 year	S		Motor car
Yellow Creek 2	R. A. Jennings	Oct. 13	Tippleman	1 year	M	3	Incline car
Hamilton County							
Soddy 1-2	Oscar Elder	April 4	Miner	5 years	S		Trolley wire
Marion County							
Whitwell 1-2	William Only	Dec. 30	Miner	3 mos.	S		Motor car
Morgan County							
Brushy Mt. No. 1	Ed Bond	April 15	Miner		S		Fall of slate
Brushy Mt. No. 3	Frank Deberry	Dec. 9					Fall of slate
Overton County							
Brier Hill	Porter Bilbrey	Sept. 5	Trip rider	5 mos.	S		Trolley wire

Fatal accidents in Tennessee coal mines in 1911, *by counties and mines—continued.*

Name of County and Mine	Name of person Killed	Date of Accident	Occupation	Experience	Married or Single	No. of Children	Cause of Accident
Rhea County							
Fox 2	Grover Denton	June 10	Miner	1 mo.	S		Mine car and timbers
Roane County							
Rockwood, Old	Will Evans	June 16	Miner	10 years	M		Fall of slate
Rockwood, Old	J. A. Griffith	March 11	Miner	27 years	M	6	Fall of roof
Scott County							
Glen Mary 2-4	Alvin Young	Oct. 30	Miner	10 years	M		Fall of slate
White County							
Clifty Creek 1	Frank Southerland	Aug. 19	Miner	10 years	M	3	Fall of roof
Ravenscroft	N. J. Simmons	Oct. 17	Miner	10 years	M	2	Fall of roof

RECAPITULATION OF FATAL ACCIDENTS.

The following table gives a recapitulation of fatal accidents in the Tennessee coal mines for 1911 by counties.

Recapitulation of fatal accidents in Tennessee coal mines in 1911.

County	No.	Name of Mine	No.	Occupation	No.	Cause of Accident	No.
Anderson	86	Block 2	2	Pick Miners	78	Number Killed:	
Campbell	10	Blue Gem	1	Machine Miners	4	Underground	
Claiborne	4	Brier Hill 1	1	Coal Loaders	1	1. By falls of roof (coal,	
Hamilton	1	Brushy Mt.	2	Foremen	1	rock, etc.	14
Marion	1	Clifty Creek 1	1	Drivers	13	2. By mine cars and	
Morgan	2	Cross Mt. 1	84	Trackmen	5	haulage motors	5
Overton	1	Elk Valley	1	Motormen	5	3. By explosion of coal	
Rhea	1	Fork Ridge	1	Trappers	1	dust and gas	84
Roane	2	Fox 2	1	Miscellaneous	3	4. By explosion of mis-	
Scott	1	Gem	3			fires	1
White	2	Glen Mary 2-4	1			5. By electricity (Shock	
		Pruden	1			or burns)	4
		Ravenscroft	1				
		Rex 1	1			Total number killed	
		Rockwood Old	2			underground	108
		Soddy 1-2	1			Surface	
		Sterling 1-2	1			1. By mine cars and	
		Sun	1			haulage motors	3
		Westbourne	1				
		Whitwell 1-2	1			Total killed on surface	3
		Wind Rock 1	2				
		Yellow Creek 2	1				
Total	111	Total	111	Total	111	Grand total	111

RECAPITULATION.

First District		Second District	
Marion County	1	Hamilton County	1
Overton	1	Morgan	2
White	2	Rhea	1
		Roane	2
Total	4	Scott	1
		Total	7

Third District	
Anderson	86
Campbell	10
Claiborne	4
Total	100
Grand total	111

FATAL ACCIDENTS 1894-1911.

This table gives miscellaneous statistics of fatal accidents in the coal mines of Tennessee from 1894 to 1911, inclusive, showing total number killed, number of wives made widows, number of children rendered fatherless, total average number of employes, number of employes to each life lost, total number of tons of coal mined, and total number of tons of coal mined to each employe.

General statistics of fatal accidents in Tennessee coal mines, 1894-1911.

YEAR	Number Killed	Number of Wives Made Widows	Number of Children Made Fatherless	Total Average Number of Employes	Average Number of Employes to Each Life Lost	Coal Mined (Short Tons)	Coal Mined to Each Life Lost (Short Tons)	Coal Mined by Each Employe (Short Tons)
1894	12	6	16	5,542	461	2,180,879	181,740	393.52
1895	a37	19	50	5,120	138	2,319,720	62,695	453.07
1896	22	12	29	6,531	296	2,663,714	121,078	407.85
1897	10	6	13	6,337	633	2,880,994	288,099	454.63
1898	18	10	24	7,820	411	3,084,748	162,499	394.40
1899	20	11	27	7,694	384	3,736,134	186,806	485.50
1900	10	6	13	8,691	869	3,904,048	390,404	453.50
1901	b44	20	62	8,418	191	3,785,672	86,038	449.70
1902	c226	137	324	8,759	39	4,232,332	18,727	483.20
1903	26	13	26	9,673	372	4,810,758	185,029	499.40
1904	28	10	16	9,972	356	4,847,242	173,123	486.08
1905	29	13	30	10,517	363	5,552,576	191,468	527.96
1906	33	16	41	10,736	325	6,272,457	190,077	584.24
1907	31	19	51	11,098	358	6,940,911	223,900	625.42
1908	34	23	47	11,122	327	6,082,851	178,908	547.00
1909	31	18	32	10,946	343	6,207,483	200,241	567.08
1910	38	30	48	11,174	294	6,908,688	181,808	618.28
1911	d111	73	154	10,825	97	6,466,224	58,254	597.34

a Twenty-five of these were killed by coal dust explosion at the Dayton Coal & Iron Company mines, at Dayton.

b Twenty of these were killed in the explosion of the Richland mine at Dayton, operated by the Dayton Coal & Iron Company.

c Of this number, sixteen were killed in the explosion of the Nelson mine at Dayton, operated by the Dayton Coal & Iron Company, and one hundred and eighty-four were killed in the explosion of the Fraterville mine at Coal Creek, operated by the Coal Creek Coal Co.

d Eighty-four of these were killed in the explosion of the Cross Mountain mine at Briceville, operated by the Knoxville Iron Company.

NON-FATAL ACCIDENTS.

The following table gives the non-fatal accidents in the coal mines of Tennessee for 1911, by counties and mines alphabetically, and gives the names and occupation of those hurt, together with the date, cause, and extent of injury.

Non-fatal accidents in Tennessee coal mines in 1911, by counties and mines.

County and Mine	Name of Person Injured	Date of Accident	Occupation	Cause and Extent of Injury
Anderson County				
Black Diamond No. 1	J. W. Williams	Feb. 2	Miner	Mine car; one bone of leg broken
Black Diamond No. 5	Wilburn Alred	May 9	Miner	Fall of slate; rib fractured
Black Diamond No. 5	J. R. Rutherford	March 22	Miner	Mine car; rib broken
Black Diamond No. 5	C. C. Williams	May 9	Miner	Fall of slate; two ribs broken
Buck Mountain	Robert Cook	Aug. 21	Timberman	Log in motion; collar bone broken
Buck Mountain	Ben Kesterson	Oct. 4	Repair man	Hot paint; arm burned
Buck Mountain	Dock Miller	Oct. 6	Miner	Fall of slate; finger mashed off
Cross Mt. 1	Henry Burton	Sept. 8	Driver	Mine car; fingers mashed
Cross Mt. 1	Luke Farmer	Sept. 7	Miner	Mine car; 2 ribs broken
Cross Mt. 1	Milas Keys	Aug. 28	Greaser	Mine car; thumb mashed, amputated
Cross Mt. 1	Ernest Vowel	June 26	Driver	Mine car; toe mashed
Cross Mt. 1	Jno. E. White	Dec. 5	Machine Miner	Mining machine; neck and head
Cross Mt. 1	Dave Williams	Nov. 20	Miner	Fall of slate; back and chest
Cross Mt. 3	T. R. Messanore	June 2	Driver	Mine car; finger mashed
Middle Ridge	Wm. Underwood	Jan. 19	Timberman	Fall of slate; leg broken
Piedmont 2	F. M. Winningham	Oct. 23	Miner	Fall of slate; 4 toes bruised and cut
Piedmont 4	C. A. Hall	Nov. 29	Miner	Fall of rock; leg broken
Tennessee	George Duncan	May 24	Mechanic	Machinery; thumb mashed
Tennessee	Jordon Moore	April 13	Miner	Fall of slate; 2 ribs broken
Wind Rock No. 1	Ed. Barnes	Dec. 30	Machine Miner	Mining machine; ankle and foot br.
Wind Rock No. 1	Harry Bryson	Jan. 3	Machine Helper	Machinery; finger cut off
Wind Rock No. 1	George Haile	Feb. 3	Motorman	Electricity; fingers burned
Wind Rock No. 1	George Haile	Nov. 17	Motor Coupler	Mine cars; hip bruised
Wind Rock No. 1	Will Hedgeroth	June 27	Miner	Mine cars; hand crushed
Wind Rock No. 1	Thomas Johnson	Feb. 18	Miner	Fall of slate; hip bruised
Wind Rock No. 1	James R. Johnson	May 2	Machine Miner	Electricity; toes cut and mashed
Wind Rock No. 1	W. H. Jones	Sept. 28	Machine Miner	Fall of slate; hand cut and bruised
Wind Rock No. 1	Thomas Mayton	May 8	Machine Helper	Mining machine; fingers cut and bruised
Wind Rock No. 1	Howard Melton	Oct. 21	Miner	Fall of coal; toe broken
Wind Rock No. 1	Sam Smith	Nov. 21	Miner	Mine car; finger bruised and cut
Wind Rock No. 1	Burris Stallings	April 10	Miner	Motor; head, chest and arm
Wind Rock No. 1	Will West	Aug. 24	Miner	Shot and smoke; head and nerves
Campbell County				
Caryville	Fred Cox	Sept. 1	Driver	Mine car; fingers mashed off
Caryville	John Slavey	April 14	Miner	Fall of slate; head cut and bruised
Caryville	Hiie Ward	June 2	Miner	Fall of slate; back injured
Caryville	Link Wilson	April 26	Miner	Fall of slate; hip and back
Chaska	John Brock	Aug. 9	Trackman	Fall of slate; leg hurt
Chaska	Nath Reed	Sept. 13	Miner	Mine car; hand bruised
Chaska	Nathan Reed	Oct. 27	Miner	Fall of slate; hand cut and bruised
Chaska	James Walker	June 2	Tippleman	Mine car; hand mashed
Davis Creek 1	L. F. Buckner	Jan. 25	Driver	Mine car; foot mashed
Davis Creek 1	Lincoln Glasby	Aug. 2	Miner	Mine cars; two ribs fractured
Elk Valley	John Smith	June 21	Miner	Fall of rock; hip and back bruised
Falls Branch	S. F. Broughton	Jan. 23	Miner	Fall of slate; leg broken
Falls Branch	Wm. Finzee	May 31	Miner	Fall of slate; body contused
Falls Branch	Jno. Gaines	July 17	Miner	Explosives; eyes injured
Falls Branch	Isaac Lovely	Dec. 5	Miner	Fall of roof; rib and leg broken
Gem	Charles Cox	May 25	Miner	Fall of coal; hip and side bruised
Gem	Thomas Miller	May 29	Miner	Fall of coal; chest and back bruised
Italian B. G.	J. H. Wilson	Oct. 24	Miner	Fall of slate; leg fractured
Kimberly	Jno. Green	May 6	Miner	Fall of slate; leg fractured

Non-fatal accidents in Tennessee coal mines in 1911, *by counties and mines—continued.*

County and Mine	Name of Person Injured	Date of Accident	Occupation	Cause and Extent of Injury
CAMPBELL CO. CON.				
Kimberly	Lee Grubbs	Feb. 1	Miner	Fall of roof; shoulders, chest and hips
Marion-Anna	John Anderson	Jan. 27	Tippleman	Tipple; toes cut off
Red Ash	Tom Lamb	Jan. 10	Miner	Draw slate; rib broken head cut
Red Ash	Joe Turney	Nov. 12	Machine Miner	Mining machine; foot mashed
Rex No. 2	I. M. Clark	Feb. 8	Miner	Draw slate; ankle broken, back bruised
Rich Mt.	E. M. Beasley	Aug. 17	Acting Manager	Breaking of rope; head and shoulder br.
Rich Mt.	Frank Bonime	April 25	Miner	Fall of slate; hip lacerated
Rich Mt.	George Nichols	Jan. 26	Miner	Fall of slate; back bruised
Rich Mt.	James Quintrell	Aug. 17	Foreman	Break of rope; three ribs broken
Rich Mt.	H. W. Tillery	Aug. 17	Superintendent	Break of rope; leg broken, amputated
Southern 1	Walter Cates	Nov. 12	Miner	Draw slate; shoulders dislocated
Southern 1	Wil Francis	Feb. 17	Trapper	Mine car; foot crushed
Southern 1	Charles Ledford	June 19	Miner	Draw slate; chest and bowels contused
Southern 1	Will Lee	May 18	Miner	Draw slate; back and hip bruised
Southern 1	Alf Pore	June 9	Miner	Draw slate; knee bruised
Southern 1	Alf Pore	Nov. 10	Miner	Fall of slate; hand lacerated and bruised
Sun	Will L. Lenard	Jan. 29	Miner	Machinery; head hurt, internal injury
Tennessee-Jellico	Zack Allen	July 31	Miner	Fall of slate; back and hips bruised
Tennessee-Jellico	W. M. Barnette	July 23	Miner	Fall of slate; leg, head and hips
Tennessee-Jellico	James Gallion	May 8	Miner	Fall of coal; one bone of leg broken
TennesseeJellico	Craig Hoover	April 26	Coupler	Mine car; two fingers lost
Tennessee-Jellico	Homer Rorex	April 19	Driver	Mine car; toe broken
Wynn	J. D. McCracken	April 1	Miner	Fall of slate; arm and leg broken
Zechini	Wesley Rowe	April 25	Coupler	Mine car; finger lost
CLAIBORNE COUNTY				
Buffalo	Bige Jones	Oct. 26	Miner	Fall of coal; finger lost
Buffalo	J. T. Kidwell	Dec. 6	Miner	Draw slate; back and leg injured
Fork Ridge	E. W. Adams	Jan. 12	Miner	Fall of slate; hip joint fractured
Fork Ridge	Harvey Body	Mar. 13	Coupler	Mine car, foot mashed
Fork Ridge	Jake Daniel	April 22	Miner	Draw slate; head, shoulders, back legs
Fork Ridge	Jim England	July 7	Wireman	Fall of slate; thigh fractured
Fork Ridge	Prince Fisher	Mar. 29	Hostler	Animal; head lacerated
Fork Ridge	Bull Justice	Oct. 13	Laborer	Powder explosion; face and hands burn'd
Fork Ridge	Richard Miller	July 4	Miner	Fall of slate; leg fractured
Fork Ridge	Bud Major	Dec. 4	Miner	Mine car; knee sprained
Fork Ridge	Troy McBee	Jan. 3	Miner	Fall of slate; thigh, hips and back
Fork Ridge	R. Polstoff	Oct. 12	Bratticeman	Mine car; foot bruised and sprained
Fork Ridge	J. R. Watkins	Sept. 26	Miner	Mine car; ankle mashed
Fork Ridge	Tom Wiseman	Dec. 6	Miner	Fall of slate; fibula fractured
King Mt.	Warrick A. Dore	Dec. 30	Miner	Fall of slate; hips and body bruised
Mingo	Tom Fletcher	Jan. 27	Machine Miner	Mine car; arm broken
Pruden	Ed. Blankenbeckler	July 12	Miner	Draw slate; nose broken
Pruden	Bartolo Bonera	June 26	Miner	Mine car; wrist sprained
Pruden	John Jones	June 27	Trackman	Dynamite explosion; body and limbs
Pruden	Andy Norman	Jan. 20	Miner	Fall of slate; leg and two ribs broken
Pruden	Wm. Piper	April 18	Car Trimmer	Railway car; body bruised
Pruden	Gordon Randolph	May 1	Driver	Mine cars; thighs bruised
Pruden	Bart Smith	Jan. 20	Miner	Powder explosion; face and hands burn'd
Pruden	Mack Smith	Jan. 20	Miner	Powder explosion; face and hands burn d
Reliance	John J. Baker	Mar. 29	Miner	Fall of coal; skull fractured
Standard	G. M. Stanfield	July 18	Miner	Fall of coal; hand mashed
Yellow Creek	Rule B. Mabe	Oct. 13	Driver	Monitor car; head bruised
Yellow Creek	Geo. Miller	July 29	Miner	Fall of slate; back and face
Yellow Creek	D. L. Settle	Oct. 13	Miner	Monitor car; body bruised
Yellow Creek	Jeff Young	Oct. 13	Miner	Monitor car; back bruised
GRUNDY COUNTY				
Coalmont A	Ruff Husky	Dec. 7	Driver	Mine car; hand cut and bruised
Coalmont A	Joe Roberts	Oct. 25	Trackman	Mine car; leg broken
Reid Hill	Steve Griswold	Nov. 21	Driver	Mine car; arm broken

Non-fatal accidents in Tennessee coal mines in 1911, *by counties and mines—continued.*

County and Mine	Name of Person Injured	Date of Accident	Occupation	Cause and Extent of Injury
Hamilton County				
Montlake	O. L. Nance	May 31	Contractor	Mine car; body bruised
Montlake	L. J. Yother	Mar. 8	Miner	Fall of coal; leg broken
Sale Creek	Sam Goodson	Dec. 12	Driver	Animal; finger broken
Soddy 1-2	Tom Rees	April 27	Driver	Mine car; knee sprained and bruised
Soddy 1-2	C. Weatherton	Dec. 1	Driver	Animal; finger broken
Soddy 4	J. W. Price	June 22	Miner	Fall of coal; leg broken
Marion County				
Battle Creek	Jesse Bates	June 21	Miner	Fall of roof; thigh fractured, hip bruised
Battle Creek	John Harvey	Aug. 23	Driver	Fall of slate; leg broken
Pryor Ridge 2	George Nolan	June 1	Miner	Fall of slate; collar bone broken, face br.
Whitwell 1-5	Jim Allen	Aug. 2	Miner	Fall of coal; hand bruised
Whitwell 1-5	Hugh Barnet	Oct. 26	Miner	Fall of slate; leg and ankle bruised
Whitwell 1-5	William Blaylock	March 4	Bratticeman	Mine car; leg bruised
Whitwell 1-5	Jno. Chadwick	July 21	Miner	Mine car; fingers bruised
Whitwell 1-5	Jno. W. Cline	April 20	Coupler	Mine car; hand cut and bruised
Whitwell 1-5	Floyd Coulter	June 19	Driver	Mine car; leg lacerated
Whitwell 1-5	Ed Davis	Sept. 16	Miner	Mine car; arm and hand bruised
Whitwell 1-5	Taylor Doss	July 18	Miner	Fall of slate; hand bruised
Whitwell 1-5	Tom Doss	Dec. 4	Miner	Mine car; arm and wrist sprained
Whitwell 1-5	Alex Dowman	Jan. 28	Driver	Fall of slate; back and breast
Whitwell 1-5	Ben Gerren	Nov. 30	Coupler	Mine car; hand bruised
Whitwell 1-5	Ben Gerren	May 31	Coupler	Mine car; head lacerated
Whitwell 1-5	Dock Graham	July 1	Coupler	Mine car; back sprained
Whitwell 1-5	Jno. Green	Sept. 8	Miner	Timbers; back bruised
Whitwell 1-5	Jno. Green	Sept. 20	Miner	Mine car; breast bruised
Whitwell 1-5	Ed. Griffith	Dec. 2	Driver	Animal; face lacerated
Whitwell 1-5	Lawrence Griffith	Sept. 1	Car Pusher	Mine car; foot bruised
Whitwell 1-5	Hodges Haaron	Sept. 9	Driver	Fall of slate; knee sprained and bruised
Whitwell 1-5	Albert Henry	May 9	Tippleman	Mine car; finger mashed
Whitwell 1-5	John Hixon	Jan. 20	Gang Foreman	Mine car; ankle sprained
Whitwell 1-5	Rollie Holt	Jan. 24	Driver	Animal; face lacerated
Whitwell 1-5	Jeff Hooper	Aug. 14	Miner	Fall of slate; legs bruised
Whitwell 1-5	J. S. Hooper	Sept. 22	Miner	Fall of coal; foot bruised
Whitwell 1-5	Conan Jones	Mar. 9	Machine Miner	Cleaver; face lacerated
Whitwell 1-5	John Land	Sept. 23	Driver	Animal; ankle bruised
Whitwell 1-5	Mack Lemons	Sept. 1	Miner	Fall of slate; finger bruised
Whitwell 1-5	Ben McDonald	Nov. 9	Laborer	Machinery; three fingers lost
Whitwell 1-5	Lee O. Matthews	Aug. 8	Miner	Coal; eye injured
Whitwell 1-5	Will Millard	Jan. 18	Driver	Mine car; foot and ankle bruised
Whitwell 1-5	Jim Miller	Nov. 8	Miner	Fall of roof; back bruised
Whitwell 1-5	Arthur Mitchell	Dec. 19	Miner	Fall of coal; finger bruised
Whitwell 1-5	Dave Morrison	Jan. 3	Coupler	Mine cars; fingers bruised
Whitwell 1-5	Green Morrison	Nov. 3	Miner	Unloading slate; back sprained
Whitwell 1-5	Will Mosier	Jan. 13	Miner	Fall of slate; back and hips bruised
Whitwell 1-5	Jno. Perkins	July 7	Miner	Loading coal; finger lost
Whitwell 1-5	W. H. Powell	Oct. 21	Miner	Mine car; finger lost
Whitwell 1-5	John Prigmore	Feb. 11	Miner	Fall of slate; leg broken, back bruised
Whitwell 1-5	Matt Pryor	Jan. 16	Carpenter Frm	Timbers, bone in foot broken
Whitwell 1-5	Joe Quarles	July 20	Miner	Mine car; end of finger lost
Whitwell 1-5	Earnest Roberson	Sept. 22	Motor Coupler	Tram; hip bruised
Whitwell 1-5	Victor Ross	July 17	Miner	Lighted shot; face, neck chest burned
Whitwell 1-5	W. L. Ross	Nov. 28	Miner	Fall of slate; shoulder dislocated
Whitwell 1-5	Ed Brown	Sept. 30	Miner	Mine car; end of finger cut off
Whitwell 1-5	Foster Shadrick	July 12	Miner	Fall of coal; hand bruised
Whitwell 1-5	Foster Shadrick	Nov. 27	Miner	Mine car; one bone of arm broken
Whitwell 1-5	George Smith	Aug. 16	Miner	Fall of slate; hand and leg contused
Whitwell 1-5	Will Smith	Sept. 27	Miner	Mine car; hand bruised
Whitwell 1-5	Walter Snyder	Feb. 2	Foreman	Mine car; one bone of arm broken

Non-fatal accidents in Tennessee coal mines in 1911, *by counties and mines—continued.*

County and Mine	Name of Person Injured	Date of Accident	Occupation	Cause and Extent of Injury
MARION COUNTY (CON).				
Whitwell 1-5	Scott Stone	Aug. 7	Miner	Mine car; finger bruised
Whitwell 1-5	Scott Terry	July 19	Tippleman	Mine car; foot sprained and bruised
Whitwell 1-5	Joe Thacker	Aug. 25	Miner	Mine car; finger end mashed off
Whitwell 1-5	Jim Thomas	Nov. 25	Driver	Mine car; finger lacerated
Whitwell 1-5	Will Turner	Nov. 30	Motorman	Motor casing; toe broken
Whitwell 1-5	Robert Williams	July 1	Miner	Motor car; foot bruised
Whitwell 1-5	M. P. Wilcox	May 23	Miner	Mine car; fingers mashed
Whitwell 1-5	Joe Young	Aug. 7	Miner	Mine car; finger end cut off
MORGAN COUNTY				
Baker 2	Frank Marmore	July 6	Miner	Fall of slate; back broken
Big Mountain	George Livily	May 30	Miner	Slate; arm lacerated
Harriman	Bart Walls	Dec. 8	Driver	Mine car; ankle sprained
Prudential	Harrison Fritts	June 16	Driver	Animal; face bruised
Prudential	Will Brown	Mar. 31	Driver	Mine cars; ankle and foot bruised
RHEA COUNTY				
New Prospect	Ed Holden	July 5	Rope Conductor	Fall of trestle; side and hips bruised
New Prospect	Dave Long	July 5	Tippleman	Fall of trestle; arm bruised
New Prospect	Charles Smith	July 5	Tippleman	Fall of trestle; body bruised
ROANE COUNTY				
McLean	Sewell Day	Oct. 27	Miner	Fall of roof; arm broken
Old	Sherman Dougherty	Dec. 7	Trapper	Fall of roof; arm fractured
Old	D. J. Francis	Dec. 2	Driver	Gas ex.; face, neck, hands & arms burned
Old	Jesse Gunn	Oct. 19	Driver	Fall of roof; head cut
Old	J. P. Hamby	June 21	Shot Firer	Gas ex. face, neck, arms & hands burned
Old	W. D. Kelly	Dec. 2	Foreman	Gas ex.; face, arms and hands burned
Old	Brance Keylon	Nov. 18	Miner	Fall of slate; head cut
Old	Will Kindrick	April 18	Miner	Fall of timber; jaw & nose broken, head
Old	Tom King	July 29	Driver	Fall of slate; body bruised [injured
Old	J. Q. Knox	Oct. 14	Miner	Gas explosion; face and arms burned
Old	Sam McNelly	Dec. 12	Rope Rider	Rope; chest and shoulders bruised
SCOTT COUNTY				
Phillips	Fred Phillips	Sept. 4	Miner	Lighted shot; eyes and face injured
WHITE COUNTY				
Bon Air Shaft	Louis Johnson	Jan. 16	Laborer	Mining machine; foot bruised
Eastland No. 2	A. J. Houts	May 2	Miner	Fall of slate; back and hips
Ravenscroft	Louis Jusharg	April 13	Coal Loader	Fall of slate; hip, foot and ankle
Ravenscroft	Nelson Simmons	April 25	Contractor	Fall of roof; back broken
Ravenscroft	Grover Templeton	Feb. 21	Miner	Lighted shot; face and arms burned

RECAPITULATION OF NON-FATAL ACCIDENTS.

The following table gives a general recapitulation of non-fatal accidents in the coal mines of Tennessee for 1911.

Recapitulation of non-fatal accidents in Tennessee coal mines in 1911.

County	No.	Name of Mine	No.	Occupation	No.	Cause of Accident	No.
Anderson	32	Baker 2	1	Pick Miners	112	Underground	
Campbell	43	Battle Creek	2	Machine Miners	8	Number injured:	
Claiborne	30	Big Mt.	1	Coal Loaders	11	1. By falls of roof (coal,	
Grundy	3	Black Diamond 1	1	Foremen	3	rock, etc.)	61
Hamilton	6	Black Diamond 5	3	Drivers	28	2. By falls of coal (other	
Marion	59	Bon Air Shaft	1	Trackmen	2	than roof coal)	20
Morgan	5	Buck Mt.	3	Shotfirers	1	3. By mine cars and	
Rhea	3	Buffalo	2	Motormen	2	haulage motors	50
Roane	11	Caryville	4	Timbermen	2	4. By gas explosion	4
Scott	1	Chaska	4	Tipplemen	6	5. By explosives	9
White	5	Coalmont A	2	Trappers	2	6. By electricity	1
		Cross Mt. 1	6	Wiremen	1	7. By animals	5
		Cross Mt. 3	1	Miscellaneous	30	8. By mining machines	6
		Davis Creek 1	2			9. By other machinery	1
		Eastland 2	1			10. By other causes	10
		Elk Valley	1				
		Falls Branch	4			Total inside	167
		Fork Ridge	12			Surface	
		Gem	2			Number injured:	
		Harriman	1			1. By mine cars and	
		Italian, B. G.	1			haulage motors	15
		Kimberly	2			2. By electricity	1
		King Mt.	1			3. By machinery	3
		Marion-Anna	1			4. By railway cars	1
		McLean	1			5. By other causes	11
		Middle Ridge	1				
		Mingo	1			Total outside	31
		Montlake	2				
		Phillips	1				
		Piedmont	2				
		Prospect	3				
		Pruden	8				
		Prudential	2				
		Pryor Ridge	2				
		Ravenscroft	3				
		Red Ash	2				
		Reid Hill	1				
		Reliance	1				
		Rex 2	1				
		Rich Mt.	5				
		Rockwood Old	10				
		Sale Creek	1				
		Soddy 1-2	2				
		Soddy 4	1				
		Southern 1	6				
		Standard	1				
		Sun	1				
		Tennessee	2				
		Tenn.-Jellico	5				
		Whitwell 1-5	56				
		Windrock 1	13				
		Wynn	1				
		Yellow Creek	4				
		Zechini	1				
Total	198	Total	198	Total	198	Grand total	198

CAUSES OF FATAL AND NON-FATAL ACCIDENTS.

The following table gives the causes of non-fatal and fatal accidents in the Tennessee coal mines for 1911 by counties.

Causes of fatal and non-fatal accidents in Tennessee coal mines in 1911.

County	Fall of Roof or Coal		Gas and Dust Explosions		Mine Cars & Motors		Powder Exp. & Windy Sh.		Other Causes		Total	
	Killed	Inj.	Killed	Inj.	Killed	Inj.	Killed	Inj.	Killed	Inj.	Killed	Inj.
Anderson	1	11	84	------	------	11	------	1	1	9	86	32
Campbell	4	27	------	------	4	9	1	1	1	6	10	43
Claiborne	2	14	------	------	2	10	------	4	------	2	4	30
Grundy	------	------	------	------	------	3	------	------	------	------	------	3
Hamilton	------	2	------	------	------	2	------	------	1	2	1	6
Marion	------	18	------	------	1	28	------	1	------	12	1	59
Morgan	2	1	------	------	------	2	------	------	------	2	2	5
Overton	------	------	------	------	------	------	------	------	1	------	1	------
Rhea	------	------	------	------	1	------	------	------	------	3	1	3
Roane	2	5	------	4	------	------	------	------	------	2	2	11
Scott	1	------	------	------	------	------	------	1	------	------	1	1
White	2	3	------	------	------	------	------	1	------	1	2	5
Total	14	81	84	4	8	65	1	9	4	39	111	198

CLASSIFICATION OF FATAL ACCIDENTS.

The following five tables on fatal accidents in the different states and foreign countries have been compiled from data and reports of the Federal government; and also from reports received from Foreign countries.

They are given here for convenience of comparison.

This table shows the men killed in the mines of the United States (underground only) by states, arranged in relation to causes of accident, for the years 1910 and 1911.

Classification of Fatal Accidents in Mines.

STATES	Falls of Roof or Coal		Mine Cars and Locomotives		Gas and Dust Explosions and Windy and Blowout Shots		Explosives		All Other Causes		Total	
	1910	1911	1910	1911	1910	1911	1910	1911	1910	1911	1910	1911
Alabama	55	47	20	14	139	130	10	5	14	8	238	204
Arkansas	10	9	----	1	4	----	----	----	----	1	14	11
Colorado	73	47	18	12	210	18	5	1	12	6	318	84
Illinois	74	86	27	40	8	9	9	13	5	5	123	153
Indiana	25	19	6	4	6	4	9	10	1	3	47	40
Iowa	21	22	4	12	1	----	2	----	1	2	29	36
Kansas	7	20	1	----	1	10	3	3	----	7	12	40
Kentucky	21	27	5	3	50	1	6	3	3	7	85	41
Maryland	10	12	3	1	----	----	1	----	1	1	15	14
Michigan	4	4	----	----	----	----	1	----	1	3	6	7
Missouri	8	7	3	----	----	----	1	----	2	----	14	7
Montana	7	10	3	2	----	----	----	1	----	----	10	13
New Mexico	15	16	----	1	----	----	1	1	----	----	16	18
North Dakota	1	----	----	----	----	----	1	1	----	----	2	1
Ohio	103	90	16	12	17	----	4	1	9	5	149	108
Oklahoma	11	9	3	6	16	7	----	4	1	3	31	29
Oregon	----	1	----	----	----	----	----	----	----	----	----	1
Pennsylvania:												
Bituminous	306	317	107	95	15	30	10	3	37	51	475	496
Tennessee	22	15	3	6	----	84	10	1	2	2	37	108
Texas	4	5	1	1	----	----	----	2	2	----	7	8
Utah	8	10	2	2	----	----	1	----	1	----	12	12
Virginia	35	35	1	18	10	5	----	----	8	2	54	60
Washington	9	11	5	6	18	----	4	2	6	3	42	22
West Virginia	203	194	51	58	3	50	8	2	26	26	291	330
Wyoming	25	26	4	2	----	1	8	1	----	1	37	31
Total	1,057	1,039	283	296	498	349	94	54	132	136	2,064	1,874
Per cent of total underg'r. fatalities	51.21	55.44	13.71	15.80	24.13	18.62	4.55	2.88	6.40	7.26	100.	100.

FATAL ACCIDENTS IN NORTH AMERICA.

This table shows the number of men killed in and about the mines in the United States, by states, also for British Columbia and Nova Scotia, from 1900 to 1911, inclusive.

Fatal accidents in coal mines 1900, 1911.

STATES, TERRITORIES AND PROVINCES	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911
Alabama	37	41	50	57	84	185	96	154	108	129	238	209
Arkansas	----	----	----	----	----	----	----	----	----	a	14	12
Colorado	29	55	73	40	89	60	88	99	61	99	323	91
Illinois	94	99	99	156	157	199	155	165	183	213	143	172
Indiana	18	24	24	55	34	47	31	53	45	50	51	46
Iowa	29	27	55	21	31	24	37	35	38	28	33	40
Kansas	20	10	30	36	b16	36	30	52	31	35	17	42
Kentucky	17	21	19	25	19	31	40	32	40	33	86	45
Maryland	7	12	11	16	12	16	13	5	12	19	17	15
Michigan	10	6	6	8	7	8	6	7	6	9	6	7
Missouri	10	15	10	17	11	11	16	8	10	21	14	8
Montana	6	7	12	5	9	8	13	14	21	12	12	13
New Mexico	15	9	17	17	15	5	9	31	34	18	16	21
North Dakota	----	----	----	----	----	----	----	----	----	a	2	1
Ohio	68	72	81	124	118	114	126	153	112	115	151	109
Oklahoma	40	44	60	33	30	44	39	32	44	40	40	33
Oregon	----	----	----	----	----	----	----	----	----	a	----	1
Pennsylvania:												
Anthracite	411	513	300	518	595	644	557	708	678	567	601	710
Bituminous	265	301	456	402	536	479	477	806	572	506	539	529
Tennessee	10	44	226	26	28	29	33	31	34	31	38	111
Texas	----	----	----	----	----	----	----	----	----	a	7	8
Utah	209	9	8	7	9	7	7	8	8	16	15	14
Virginia	----	----	----	----	----	----	----	----	----	a	57	68
Washington	33	27	34	25	31	13	21	37	25	39	43	27
West Virginia	141	134	120	159	140	194	269	356	625	364	329	350
Wyoming	----	----	----	----	----	----	----	----	----	a	38	33
British Columbia	17	102	139	42	37	12	15	31	18	57	28	16
Nova Scotia	21	14	19	31	19	20	28	35	39	33	30	a
Total deaths	1,507	1,586	1,849	1,820	2,027	2,186	2,106	2,852	2,744	2,434	2,898	2,731

a—Not available.

b—Six months only.

FATAL ACCIDENT RATE IN NORTH AMERICA.

This table shows the number of men killed per 1,000 employed, in the United States by States, also for British Columbia and Nova Scotia from 1900 to 1911, inclusive.

Fatal accident rates per 1,000 employed in coal mines, 1900-1911.

STATES, TERRITORIES AND PROVINCES	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911
Alabama	2.59	2.90	2.79	2.94	4.77	10.75	5.23	7.61	5.75	6.40	10.71	9.50
Arakansas	------	------	------	------	------	------	------	------	------	a	2.51	2.25
Colorado	3.99	6.88	8.11	3.89	8.26	5.05	7.32	7.67	4.25	7.53	20.36	6.33
Illinois	2.39	2 24	2.15	3.13	2.87	3.36	2.49	2.47	2.58	2.93	1.97	2.27
Indiana	2 03	1.98	1.83	3.64	1.91	2.63	1.58	2.79	2.36	2.64	2.33	2.19
Iowa	2.22	2.05	4.23	1.59	1.90	1.36	2.20	2.05	2.20	1.56	1.98	2.37
Kansas	1.87	1.05	3.22	3.61	3.09	2.97	2.95	4.35	2.74	3.04	1.32	3.55
Kentucky	1.88	2.15	1.58	1.85	1.37	2.06	2.39	1.82	2.15	1.76	4.23	1.87
Maryland	1.32	2.23	1.89	2.82	2.11	2.57	2.16	0.85	2.00	3.34	2.93	2.47
Michigan	6.11	3.26	4.24	2.54	2.58	2.16	2.83	2.43	1.94	3.04	1.68	2.16
Missouri	1.31	1.63	1.09	1.85	1.09	1.06	1.65	1.70	1.06	2.31	1.44	8.33
Montana	2.53	3.24	6.19	2.32	3.59	3.67	5.43	5.12	6.68	3.11	3.13	3.36
New Mexico	7.44	4.81	10.11	7.26	7.61	2.35	3.82	10.13	9.26	5.57	4.46	5.68
North Dakota	------	------	------	------	------	------	------	------	------	a	3.75	1.32
Ohio	2.14	2.15	2.16	3.00	2.57	2.58	2.71	3.20	2.23	2.45	3.45	2.40
Oklahoma	2.59	8.35	9.62	5.42	3.63	5.76	4.81	4.15	3.02	2.76	4.62	3.78
Oregon	------	------	------	------	------	------	------	------	------	a	------	3.29
Pennsylvania:												
Anthracite	2.86	3.47	2.03	3.41	3.69	3.83	3.35	4.19	3.89	3.31	3.55	4.08
Bituminous	2.44	2.56	3.36	2.65	3.44	2.90	2.76	4.40	3.15	2.72	3.07	3.09
Tennessee	1.15	5.23	25.80	2.69	2.81	2.76	3.07	2 .79	3.06	2.77	3.19	9.98
Texas	------	------	------	------	------	------	------	------	------	a	1.67	1.61
Utah	138.96	5.06	3.24	3.21	4.06	3.57	3.69	3.07	2.99	5.36	4.91	4.06
Virginia	------	------	------	------	------	------	------	------	------	a	7 85	8.39
Washington	7.79	5.59	7.83	5.13	6.69	2.61	4.08	6.05	4.68	6.81	6.81	3 73
West Virginia	5.03	4.14	3.41	4.03	3.08	3.88	5.20	6.33	10.35	5.85	4.79	5.24
Wyoming	------	------	------	------	------	------	------	------	------	a	4.89	4.07
British Columbia	4.22	25.67	34.65	9.85	8.31	2.72	3.12	5.12	2.95	8.88	3.61	2.32
Nova Scotia	3.17	1.83	2.36	2.79	1.63	1.86	2.31	2.89	3.02	2.73	2.73	a
Average	3.25	3.21	3.48	3.16	3.33	3.40	3.20	4.15	3.84	3.39	3.89	3.72

a—Not available.

FATAL ACCIDENT RATE IN NORTH AMERICA.

The following table gives the rate of fatal accidents per 1,000 employes in the coal mines of North America, by states and provinces:

Fatal accident rate per 1,000 employes and number of lives lost per million tons of coal mined in North America, by States and Provinces, 1870 to 1908.

STATE OR PROVINCE	Years Considered	Tons of Coal Produced	Employes	Fatal Accidents		Lives Lost per 1,000,000 Tons of Coal Mined
				Number	Per 1,000 Employes	
Alabama	16	142,592,400	227,828	1,037	4.55	7.27
Arkansas	6	12,307,804	25,651	76	2.96	6.17
Colorado	25	117,663,271	188,054	1,074	5.71	9.13
Illinois	26	611,071,223	1,030,800	2,407	2.34	3.94
Indiana	24	146,490,472	245,115	547	2.23	3.73
Iowa	21	109,736,706	264,400	573	2.17	5.22
Kansas	22	86,096,365	184,895	415	2.24	4.82
Kentucky	22	112,218,992	218,866	375	1.71	3.34
Maryland	19	84,322,336	93,269	165	1.77	1.96
Michigan	10	13,081,027	23,356	68	2.91	5.20
Missouri	19	61,065,829	151,444	261	1.72	4.27
Montana	18	24,464,869	37,557	138	3.67	5.64
New Mexico	14	19,243,519	29,325	212	7.23	11.02
North Dakota	1	320,742	631	4	6 34	12.47
Ohio	34	467,312,293	863,812	1,845	2.14	3.95
Oklahoma	15	33,906,783	90,774	460	5.07	13.57
Pennsylvania, Anthracite	39	1,782,024,124	4,344,074	14,625	3.37	8.21
Pennsylvania, Bituminous	32	1,806,371,376	2,729,155	6,919	2.54	3.83
Tennessee	18	69,368,153	143,029	627	4.38	9.04
Utah	16	17,754,456	24,424	285	11.67	16.05
Washington	17	38,231,315	68,645	464	6.76	12.14
West Virginia	25	453,581,594	625,566	2,887	4.62	6.36
Wyoming	5	26,140,782	29,227	339	11.60	12.97
Total	------	6,235,366,431	11,639,897	35,803	3.08	5.74
British Columbia	------	22,106,271	68,698	497	7.23	22.48
Nova Scotia	------	90,512,879	236,998	720	3.04	7.95
Total	------	112,619,150	305,696	1,217	3.98	10.81
Grand total	------	6,347,985,581	11,945,593	37,020	3.10	5.8 3

PRODUCTION OF COAL AND ACCIDENTS IN FOREIGN COUNTRIES.

The following table gives the production of coal in several foreign countries, also the United States for 1909 and 1910, and the number of employes and the number of employes killed in the mines of the respective countries, also in the United States for the same years ..

COUNTRY	Year	Production		Number Employed	Number Killed	Deaths per 1,000 Employed	Deaths per 1,000,000 Short Tons	Production in Short Tons per One Death.
		Metric Tons	Short Tons					
France	1909	37,840,000	41,711,000	190,748	223	1.169	5.346	187,045
France	1910	38,350,000	42,273,000	196,786	213	1.082	5.039	198,460
Belgium	1909	23,518,000	25,924,000	143,011	136	0.951	5.246	190,626
Belgium	1910	23,917,000	26,364,000	143,701	136	0.945	5.159	193,850
Austria (Steinkohle)	1909	13,713,000	15,116,000	70,159	75	1.069	4.962	201,547
Austria (Steinkohle)	1910	13,774,000	15,183,000	69,969				
Austria (Braunkohle)	1909	26,044,000	28,708,000	59,337	76	1.281	2.648	377,741
Austria (Braunkohle)	1910	25,133,000	27,704,000	56,699				
Prussia (Steinkohle)	1909	140,098,000	154,430,000	570,528	1,165	2.042	7.544	132,567
Prussia (Steinkohle)	1910	143,965,000	158,693,000	577,263	1,140	1.975	7.184	139,204
Prussia (Braunkohle)	1909	56,030,000	61,762,000	58,532	104	1.777	1.684	593,865
Prussia (Braunkohle)	1910	56,644,000	62,439,000	56,186	73	1.299	1.169	855,329
		Long Tons	Short Tons					
England	1909	263,759,000	295,410,000	997,708	1,424	1.427	4.820	207,405
England	1910	264,418,000	296,148,000	1,032,702	1,754	1.698	5.923	168,841
*New South Wales	1909	7,069,000	7,917,000	18,569	14	0.754	1.768	565,500
United States	1909		460,761,000	666,523	2,668	4.000	5.790	173,000
United States	1910		501,596,000	725,030	2.840	3.920	5.660	177,000

*The figures for New South Wales take into account the mining of 48,718 long tons of shale.

WAGE SCALES

The wage scales of the following mines are under the supervision of the United Mine Workers of America, and were furnished the department by Mr. Thos. M. Gann, Secretary and Treasurer, with offices at Room 3 Sedgwick Building, Knoxville:

Campbell County.
Falls Branch Coal Co., Wooldridge.
Wooldridge-Jellico Coal Co., Wooldridge.

Hamilton County.
Durham Coal and Iron Co., Chattanooga.
Montlake Coal Co., Chattanooga.

CAMPBELL COUNTY.

FALLS BRANCH COAL CO. and WOOLDRIDGE-JELLICO COAL CO. MINING.

The old contract which was made with the Falls Branch and Wooldridge-Jellico Coal Companies, on September 3, 1907, has been renewed from year to year. This contract which was extended to September 1, 1911, and is given below, was renewed in August, 1911, with little or no change of conditions and prices, for another year.

Contract of the Falls Branch Coal Co. and Wooldridge-Jellico Coal Co. ending September 1, 1911.

Resolved, That the price for mining shall be as follows:

That in the Jellico district pick-mined screen coal shall be paid for on the following basis, per ton of 2,000 pounds in weigh box.

No. 1. Under 2½ feet	$1.01
No. 2. 2½ feet to 2 feet 9 inches	.94.3
No. 3. 2 feet 9 inches to 3½ feet	.87.5
No. 4. 3 feet 6 inches and over	.80.7
Run of mine shall be, per ton of 2,000 pounds	.56.44

YARDAGE.

The standard price of entries, either tight or gob, in the Jellico district shall be $2.30 per yard in slate, but when both top and bottom are blasted, the price shall be $2.90 per yard; solid rock entries, $3.25; rock top and slate bottom, $3.70. Entries, airways, and all narrow work in coal, when used for entries and airways, shall be $1.00 per yard. When the slate parting occurs in the coal, and neither top nor bottom is blasted, the price shall be $1.40 per yard, in entries and airways, when the slate is loaded out and does not exceed 9 inches in thickness; over 9 inches and up to 18 inches in entries and rooms, 4 4-5c extra per ton shall be paid on coal.

ROOM TURNING.

In high coal, $2.45; in medium coal, $2.75; in low coal, $3.05; for double rooms in all coal, $4.55.

DAY LABOR.

Classification.	*Rate per hour*	*Rate per day*
Inside driver, one mule	21.42c	$1.93
Drivers, two mules	23.10c	2.08
Drivers, three mules	24.25c	2.17
Drivers, four mules	25.30c	2.27
Head track layer	30.18c	2.71
Assistant track layer	21.42c	1.93
Trappers	7.61c	.68
Timberman	27.29c	2.44
Timber helper	21.42c	1.93
Inside pumper and water bailer	21.42c	1.93
Motormen	27.40c	2.47
Motormen couplers (gathering)	23.31c	2.10
Motormen couplers (main haul)	21.42c	1.93
Practical miners called to company work	27.40c	2.47
Machine runner	29.08c	2.63
Machine hostler (chain)	26.25c	2.36
Machine hostler (punch)	21.42c	1.93
Outside pumper and water bailer	20.05c	1.81
Muckers, or inside labor	20.05c	1.81
Coupler man, inside	18.90c	1.70
Coupler man, outside	15.04c	1.35
Coupler boy, inside	9.76c	.88
Coupler boy, outside	7.56c	.68
Tip house man	20.05c	1.81
Drum man	22.59c	2.04
Knuckle man	20.05c	1.81
Knuckle boy	15.04c	1.35
Furnace man (digging his own coal)	22.59c	2.04
Furnace man and watchman	16.38c	1.47
Outside labor, including slate dumpers	15.04c	1.35
Blacksmith	26.35c	2.36
Pick sharpener	22.59c	2.04

Outside driver, 10c per day less than inside. Boy driver under 16 years of age, 35c per day less than regular prices.

IMPURITIES.

Any miner loading an unusual amount of dirt, slate, sulphur, or other impurities with his coal shall be laid off one day for each offense. The company's representatives will, on all such occasions, show such unusual amount. Any miner laid off for three days during any one month shall then be subject to discharge; provided, however, that no dirt, slate, sulphur, or other impurities shall be included in the measurements to determine the height of coal.

TIMBERING.

Present conditions as to timbering shall continue at all times.

TRACKS.

In addition to the iron tracks now being used, the dip places where men have to push the cars shall be provided with iron rails.

CARS.

All cars are to be handled the same as last year, but it is understood that this clause shall not be construed to have miners handle cars where it has been customary for the company to handle them heretofore.

Rents, house fuel, pick sharpening at each mine shall remain without change during the life of this contract.

HOURS.

SECTION 1. Nine hours shall constitute a day's work for all classes of labor for which a scale of wages is made in this contract.

SEC. 2. A nine-hour day means nine hours' work in the mines at the usual working place for all classes of day labor and miners. This shall be exclusive of the time required in reaching the working place and departing from the same at night.

DRIVERS.

Drivers shall take their mules to and from the stable, and the time in so doing shall not include any part of the day's work.

It is distinctly understood that the time for starting each day depends on the arrival of railroad cars, providing the run begins in two hours from the regular starting time. Pay to begin with work, and work to stop at the regular quitting time.

PAY DAY.

Payment of wages shall be semi-monthly. The pay day being on or before the last day of each month, for the work performed during the first half of the month; and on or before the 15th of the succeeding month, for work performed during the last half of the month; but it is understood that statements shall be made only once for each month. The semi-monthly pay being the last in each month to be paid in even dollars. An employe desiring to leave the employment of the company shall receive his money at once, or not later than five days after his notice is given.

CUT.

All employes whose wages are regulated by this scale shall be cut for dues and assessments, through the office, out of the first five days' work performed in each month, the same to be paid to the proper person or persons authorized to receive the same. The dues and assessments not to exceed $1.00 per month, without the special written order of each employe. Initiation fees are hereby guaranteed to be uniform throughout District No. 19, and that the payment of same shall be prorated through sixty days if necessary.

TURN.

A square turn shall be kept all over the mine, in rooms and narrow work under ordinary conditions. Miners absenting themselves from their working places for three consecutive days without first obtaining the consent of the superintendent or bank boss, shall forfeit their working places, except in cases of sickness of them-

selves or any member of their family, and except also representatives of the organization engaged in work of the organization, in which case they must notify the superintendent or bank boss. Work shall not stop at any mine on any day other than on general holidays, and on April 1, without previous agreement with the management of such mine.

NOTE—See also special provisions applying to each operating company.

HAMILTON COUNTY

DURHAM COAL AND IRON COMPANY.

The contract with the Durham Coal and Iron Company's mines at Soddy, which expired September 1, 1911, has been revised, and renewed to September 30, 1912. While the wage scale remains with few changes, practically as before, there has been some changes in the contract and rules.

The revised agreement and rules of the company are given below.

AGREEMENTS.

The Soddy Division of the Durham Coal and Iron Company and the miners and other employes of said Company, through their Executive Committee appointed by them to act for them, and the officials of the U. M. W. of A., hereby adopt as the agreements for the ensuing twelve months, ending September 30, 1912, the following, viz.:

1st. Nine hours shall constitute a day's work for all classes of labor, for which a scale of wages is made in this contract. A nine-hour day means nine hours work in the mines at usual working places for all classes of day labor and miners. This shall be exclusive of the time required of reaching the working place and departing from the same at night. The drivers shall take their mules to and from the stable, and the time in so doing shall not be included in any part of the day's work. An accommodation trip will be run in No. 1 Mine, starting at 6:30 a. m. Firing time for less than a full day to be thirty (30) minutes after run stops. For a full day, firing time will be 4:00 p. m.

2d. Two thousand pounds shall constitute a ton. Prices for mining shall be as follows, viz.:

Coal 36 inches and over	45 cents per ton
30 to 36 inches	51 cents per ton
24 to 30 inches	55 cents per ton
18 to 24 inches	65 cents per ton
Pillar coal	51 cents per ton

DRAW SLATE OR RASH ON BIG SODDY.

Where draw slate or rash over 3 inches in thickness is found on top of coal in the Big Soddy Mine, the miner is to be paid three (3) cents per ton additional for all coal mined and loaded.

3rd. Yardage prices will be as follows:

The standard price of entry, either tight or gob, will be $1.85 per yard for 5 ft. high and 8 ft. width of roadway; $2.55 per yard for 5 ft. 6 in. high and 8 ft. of roadway.

When the coal is under 24 inches in thickness, $4.05 per yard.

In entries where it is necessary to take both top and bottom, 50 cents per yard additional is to be paid. No such double lift is to be taken except by instructions of the Mine Foreman.

Airways, 50 cents per yard.

Billie rib yardage, 72 cents in coal only.

Cut-throughs, 45 cents per yard, but when more than 18 feet of solid coal is cut, special price.

All room necks turned under 16 feet in width are to be paid for at the rate of $3.25 each. Such necks to be 16 feet deep.

Wet places to be paid 2 cents per ton extra. Only such places shall be termed wet in which the water will run from drill holes when bored horizontal and in proper place, or when the water stands at face so as to require bailing.

Company to handle water when in such quantity as to require bailing.

Cut-throughs to be measured from one road prop to far side of coal.

SCALE OF WAGES.

	Per Hour	*Per Day*
Driving single mule	21.4c	$ 1.93
Driving two mules	23.1c	2.08
Driving three mules	24.3c	2.17
Driving four mules	25.3c	2.27
Boss track layer	30.2c	2.71
Assistant track layer	21.4c	1.93
Trappers	7.6c	.68
Sheavemen, inside	21.0c	1.89
Sheavemen, outside	18.9c	1.70
Rope rider, inside	25.6c	2.30
Rope rider, outside	15.7c	1.42
Inside labor on rock	18.3c	1.65
Motormen	27.4c	2.47
Main line coupler	21.4c	1.93
Inside coupler	19.4c	1.75
Inside haulage engineer	27.4c	2.47
Head car repairer	16.7c	1.50
Engineers	22.2c	2.00
Muckers	20.1c	1.81
Timbermen	27.3c	2.44
Locomotive coupler	18.0c	1.62
Coke oven draftsmen	14.0c	1.26
Firemen	17.4c	1.57
Outside labor	13.6c	1.23
Inclinemen	15.7c	1.42
Dumpers	15.1c	1.36
Tipplemen	18.1c	1.63
Blacksmith	26.2c	2.36
Pick sharpeners	22.5c	2.03
Blacksmith helpers	16.3c	1.47
Washermen	20.3c	1.83
Fireman at washer	18.9c	1.70
Labor on coke yard	14.0c	1.26
Charging coke ovens (per oven)	3.5c	
Pulling ovens (per oven)	33c, 37c, 39	
Night watchman		1.57

Outside driver, 10c per day less than inside.

Boy driver under 16 years of age, 35c per day less than regular rates.

It is understood and agreed that the mines are to run on the hour system, but that the time of the employes on day wages is to be figured by the day rate.

4th. Any miner called upon to do company work shall be paid at the rate of 24.4c per hour, $2.20 per day.

5th. Pay day shall be on the second Saturday of each month for the work done last half, and on last Saturday for work done on the first half of the month. Men absenting themselves from work on the first day of any month, or on the Monday succeeding pay day will be discharged.

6th. Blacksmithing will be 35c per month per turn. This is to cover sharpening and dressing of tools only.

7th. CUT—All employes whose wages are regulated by this scale, shall be cut for dues and assessments through the office out of the first five days' work performed in each month, the same to be paid to the proper person or persons authorized to receive the same. The dues and assessments not to exceed $1.00 per month, without special written order of each employe. Initiation fees are hereby guaranteed to be uniform throughout District No. 19, and that the payment of same shall be prorated through sixty (60) days if necessary.

8th. House coal is to be as follows:

Lump coal	$2.50 per ton
Nut coal	1.50 per ton
R. M. coal	1.50 per ton

in town limits.

9th. No committee shall visit any man at his working place, except when accompanied by the Mine Foreman, and then only to settle a grievance.

10th. It is fully understood and agreed by the parties to this agreement that all employes of this Company are required to work six days per week, when called on to do so, excepting legal holidays, half days and on pay days, and April 1st. Any employe desiring to be idle for a day must secure permission of his foreman in advance, unless prevented by sickness or other unavoidable cause. Any employe being idle without notifying his foreman shall, for the first offense, be suspended from work three days; for the second offense, be suspended for five days; and anyone being idle more than three days in any one month may be suspended for one month or discharged.

11th. If any differences arise between the operator and the miner, or between the operator and any of the employes of the mine, a settlement shall be arrived at without stopping work. If the parties immediately affected cannot reach an agreement between themselves, the question shall be referred without delay to the local committee and the company's officials. If they fail to effect a settlement, it shall be referred to the officials of District No. 19, U. M. W. of A., and the officials of the company. If they fail to adjust the grievance it shall be referred to a Board of Arbitration, composed of one or two persons from each side, with power to select an umpire. Their decision shall be final and binding on all parties to this agreement and those they represent. Arbitrators shall be appointed within three days after the case is submitted to arbitration, and they shall proceed within five (5) days to hear and determine the case. In the event the arbitrators be unable to select an umpire within fifteen days after their appointment, Judge M. M. Allison is to select an umpire from three names submitted by each respective side.

The Operator and his Superintendent and Mine Manager shall be respected in the management of the mine and in direction of the working force. All day men

shall perform whatever kind of day labor the management may direct them to perform from time to time.

The right to hire includes the right to discharge, and it is not the purpose of this agreement to abridge the rights of the employer in either of these respects. If, however, any employe shall be suspended or discharged by the Company, and it is claimed that an injustice has been done him, an investigation shall be conducted as herein provided, and if it is determined that an injustice has been done, the Operator agrees to reinstate said employe.

WITNESS our hands this the 27th day of September, 1911.

C. C. CROSS,
JOE C. WALKER,
ROBERT GANN,
J. D. SMITH,
PHIL LYNCH,
JESS COLYAR,
Scale Committee.

JOHN F. BOWDEN, *Pres.*,
PAT CAREY, *V.-P.*,
T. M. GANN, *Sec. & Treas.*,
GEO. BRANAM, *D. B. M.*,
JOHN JEFFREY, *I. E. B. M.*,
FRANK RAMAGE.

DURHAM COAL & IRON CO.,
By J. H. JONES.

MINING RULES OF THE DURHAM COAL AND IRON COMPANY.

Adopted By and Between the Durham Coal and Iron Company and Officials of the U. M. W. of A.

1. Starting time, 7 a. m. Quitting time, 4 p. m. Any violation of this rule, suspension of turn for one day; second violation, suspension for three days; third violation, discharged.

No more than two shots shall be fired in any entry at noon, except where coal has a wet measurement. In wet entries three shots will be allowed.

Any violation of this rule, suspension of turn for one day; second violation, suspension for three days; third violation, discharged.

2. Miners and mine laborers will be taken in and out of the mine by an accommodation trip. When mines work full day, the accommodation trip will leave Clayton side track at 4:15 p. m. When mines work less than a full day, the trip will leave 45 minutes after the suspension of work. Men riding this trip will be at their own risk.

3. Blacksmiths shall have all tools sharpened by 6:30 a. m. that are delivered at the shop the day before.

4. When slate falls on the roadway it shall be removed without delay; and if delay be made, the miner shall be permitted to remove the same, being paid at the rate of $2.20 per day.

5. A square turn shall be kept in all mines.

6. That there shall be an allowance of three cars per turn in preparing roadway. No miner shall prepare his room for roadway without permission of the Mine Foreman, unless the face is fifteen (15) feet in advance of the roadway, in which case he must notify the Mine Foreman by registering same at the Mines Depot. After said notice has been given, the roadway must be prepared within the period of two (2) days, unless prevented from so doing by some unforseen occurrence. In case of failure to take such top or bottom, the miner to be given employment by the company and paid at the rate of $2.20 per day until said roadway has been completed.

7. Equal rights to all and special privileges to none.

8. That no man be compelled to work double in rooms.

9. Any Company man competent to mine coal, and applying for the same, shall have preference in employing miners.

10. The Company shall help handle cars in rooms to rise where they cannot be handled by the miner.

11. In case of death of an employe or member of his family, the following rule will prevail:

Death by accident in or around the mine, the mines shall remain idle until after the funeral; death from natural causes of an employe or member of his family, the work shall not be idle, but any desiring to attend the funeral may do so, but not otherwise.

12. Docks for slate: For the first eight (8) pounds, dock will be fifty (50) pounds; for each additional two (2) pounds, an additional fifty (50) pounds. When docks equal 2,000 pounds in any one day the miner will be discharged.

13. All wrecked cars and cars for boilers to be given average weight, same to be decided by Company and Check Weighman.

14. No miner shall be allowed in the mines on idle days, unless engaged in company or special work. In case of the mines being idle by reason of insufficiency of men reporting for work, those miners reporting for work on such days are permitted to work.

15. The Company shall at times keep within reasonable distance all necessary timber, miners to place on road, properly marked with number and entry, the boss driver to see that they are promptly delivered same day to party marked for.

16. Employes will be discharged for the following reasons:

(1) Disorderly conduct or drunkenness.
(2) Gambling or shooting on Company property.
(3) Taking coal, timber or tools without permission, or changing tickets on cars.
(4) Firing before stipulated time, without permission of the Mine Foreman.
(5) Committing a nuisance in entries, air-ways or room necks.
(6) Riding on loaded trips without permission of the Mine Foreman.
(7) Leaving air or trap doors open.

17. No laborer, who is not on company work, will be allowed any turn, except entry men and sons of employes and dependent widows' sons, they to be allowed one-half turn under 16 years of age, and full turn over 16 years of age.

18. No room shall be turned off another room, except to secure coal that cannot be reached by an entry or air course.

19. Any party or parties intentionally violating the foregoing rules will be discharged.

WITNESS our hands this the 27th day of September, 1911.

C. C. Cross,
Joe C. Walker,
Robert Gann,
J. D. Smith,
Phil Lynch,
Jess Colyar,

John F. Bowden, *Pres.*,
Pat Carey, *V.-P.*,
T. M. Gann, *Sec. & Treas.*,
Geo. Branam, *D. B. M.*,
John Jeffrey, *I. E. B. M.*,
Frank Ramage.

Scale Committee.

Durham Coal & Iron Co.,
By J. H. Jones.

HAMILTON COUNTY

MONTLAKE COAL COMPANY.

The contract for Montlake Coal Company mines was made November 30, 1910, and expires April 1, 1912.

This contract is given in full below:

The Montlake Coal Company and the miners and other employes of said company, through their Executive Committee appointed by them, to act for them, and the officials of the U. M. W. of A., hereby adopt as the agreement for their government from January 1, 1911, and until April 1, 1912, as follows, to-wit:

WAGE SCALE.

Coal over 40 in.	50c
Coal 36 to 40 in.	55c
Coal 30 to 36 in.	60c
Coal 24 to 30 in.	67c
Below 24 in.	Special
Drawing Pillars	56c
Drawing Entry Stumps	55c

Per ton of 2,000 lbs. clean, merchantable coal, with as much lump as is reasonably possible to produce. When the coal is properly undermined for shooting and when shot on the solid, then 5c per ton less.

NOTE—The company's present rule as to depth of mining and burden to govern.

Narrow entries—size 5½x8	Per Yard	$2 25
Gob entries (to be shot in the tight)—size 5½x8	Per Yard	2 00
Haulway—size 6x9	Per Yard	2 50
Air course in coal—size as directed by foreman	Per Yard	50
Brushing—to give not less than one foot over cars	Per Yard	40
Room turning—consisting of neck 8 ft. wide by 15 to 21 ft. deep.—with top brushed same distance and room widened to 42 ft. at face	Per Yard	4 50
Miner (when called from his work place)		2 25
Locomotive engineer		2 00
Trainmen		1 25
Trackmen (outside)		1 15
Inside track and brattice man		2 00
Inside track and brattice man (helper)		1 50
Tipple men and general outside work		1 25
Drum man		2 00
Blacksmith		2 35
Helper		1 25
Pump and rollers	Per Month	45 00
Tain rope engineer		2 25
Tail rope fireman (steam up to blow call whistle at 6:00 A. M.)		1 50
Fan fireman (5:00 A. M. to 5:30 P. M.)		1 50
Shaker engineer (6:00 A. M. to 5:00 P. M.)		1 35
Rope rider		2 20
Helper		1 75
Mule driver (inside)		1 80
Mule drive (outside)		1 70
Greaser and coupler		72
Trapper boys		60
Hand pumper and inside laborers		1 50

No free oil, and above wages are for practical men only, and are not for inexperienced help.

The bank committee will remove the tools from the work places of miners who have forfeited their claim to the place when called upon by the mine foreman to do so.

No grievance is to be considered without the mine foreman and superintendent being present at the conference and giving their version.

DOCKS FOR SLATE.

For the first eight (8) pounds, dock will be fifty (50) pounds, for each additional two (2) pounds, an additional fifty (50) pounds. When docks equal 2,000 pounds in any one day, the miner will be discharged.

Should the company decide to install mining machines at any time during the life of this contract, and terms of employment can not be agreed upon, then this contract can be declared void, without let, hindrance or interference.

CONSTRUCTION WORK.

The erection of tipple houses, buildings, development of the coal, installation of machinery, construction of railroad sidetrack necessary for the completion of plans for operation, all being in the nature of temporary employment in construction and development work, as well as carpenters, stablemen, timbermen, and the employes of the Chattanooga & Montlake Railway Company, are to be excluded from the jurisdiction of the wage scale.

CUT.

All employes whose wages are regulated by this scale, shall be cut for dues and assessments through the office out of the first five days' work performed in each month, the same to be paid to the proper person or persons authorized to receive the same. The dues and assessments not to exceed $1.00 per month, without special written order of each employe. Initiation fees are hereby guaranteed to be uniform throughout District No. 19, and that the payment of same shall be prorated through sixty (60) days if necessary.

No committee shall visit any man at his working place, except when accompanied by the mine foreman, and then only to settle a grievance.

It is fully understood and agreed by the parties to this agreement that all employes of this company are required to work six days per week, when called on to do so, excepting legal holidays, half days on pay days, and April 1st. Any employe desiring to be idle for a day must secure permission of his foreman in advance, unless prevented by sickness or other unavoidable cause. Any employe being idle without notifying his foreman shall, for the first offense be suspended from work for three days; for the second offense, be suspended for five days; and any one being idle more than three days in any one month may be suspended for one month or discharged.

If any differences arise between the operator and the miner, or between the operator and any of the employes of the mine, a settlement shall be arrived at without stopping work. If the parties immediately affected can not reach an agreement between themselves, the question shall be referred without delay to the local committee and the company's officials. If they fail to effect a settlement, it shall be referred to the officials of District No. 19, U. M. W. of A., and the officials of the company. If they fail to adjust the grievance, it shall be referred to a board of arbitration, composed of one or two persons from each side, with power to select an umpire. Their

decision shall be final and binding on all parties to this agreement and those they represent. Arbitrators shall be appointed within three (3) days after the case is submitted to arbitration, and they shall proceed within five (5) days to hear and determine the case. In the event the arbitrators be unable to select an umpire within fifteen (15) days after their appointment, Judge M. M. Allison is to select an umpire from three (3) names submitted by each respective side.

The operator and his superintendent and mine manager shall be respected in the management of the mine and in direction of the working force. All day men shall perform whatever kind of day labor the management may direct them to perform from time to time.

The right to hire includes the right to discharge, and it is not the purpose of this agreement to abridge the rights of the employer in either of these respects. If, however, any employe shall be suspended or discharged by the company, and it is claimed that an injustice has been done him, an investigation shall be conducted as herein provided, and if it is determined that an injustice has been done, the operator agrees to reinstate said employe.

GENERAL RULES.

1. Rooms must be driven up 150 feet, exclusive of necks (when practical to do so), and miner must work his place out before being entitled to another, unless the place becomes unsafe or impracticable to be worked (in opinion of mine foreman and the bank committee).

2. Timbers of proper sizes and length must be set in rooms by the miners not over three (3) feet apart vertically and horizontally, and closer when necessary; and suitable timbers must be set in all other places requiring same, by the miner who drives the place.

3. When quitting the employment of the company, the miner must properly timber up, brush roadway, lay track up to the face, and leave his place in shape so that it can be given away without expense of dead work, before he will get a settlement.

4. Nine (9) hours shall constitute a day's work (except in cases otherwise provided for) and this means at the face or working place of each individual employe, and is exclusive of the time required in reaching or leaving the same at the commencement or completion of the day.

5. Measurements will be made once a month and as near the last as is reasonably possible.

6. Pay-days will be on the first Saturday after the 20th, after work hours, for work done in the preceding month, and no cash will be paid out on written notices or otherwise except on regular pay-days, except at the option of the company.

7. House coal will be delivered to employes within radius of the camp at $1.75 per ton for M. R. coal, and outside of the camp at prices to be agreed upon according to distance of haul, and any one found taking coal from the company or employes will be charged an amount which, in the discretion of the company, may meet the gravity of the offense.

8. Any one taking tools, mine supplies or other property of an employe without his consent, or taking company tools or property from the department in which they belong, without first getting the consent of the employe in whose charge they are, will be rigidly dealt with, and unless offering the very best kind of an excuse will be discharged.

9. The following monthly stoppages will be made, for those living within the radius of the camp: Doctor—single men, 75c; heads of families, $1.25. Blacksmiths

—for sharpening augers and picks, 35c. School—single men, 25c; those having children of school age, 50c.

10. Prices for rent, commissaries and mining supplies will remain unchanged, except as market conditions may warrant changes from time to time.

11. Hours for work shall be from 7 A. M. to 4 P. M. Shooting hour, 4 P. M. Entry men are to start firing and must shoot on time. They are also expected to report any on their road shooting out of order or at the proper time as provided for. Neither coal nor slack are to be used for tamping. Open lights must be kept at a safe distance from powder, and miner must remove his lamp before making up shots. Powder kegs are not to be punched with picks or instruments of steel or iron, but the caps must be removed cautiously.

12. When a full day's work can not be had, the company will quarter out and pay day men for only the actual hours worked.

13. When the air of the mine has been made impure through the burning of kerosene oil, or from any other cause contrary to the mining law, or where the circuit has been impaired through obstructions placed in the airway, or the leaving open of doors, injury to stoppings, etc., a penalty will be applied when done through carelessness or negligence, and when done from maliciousness, the Mining Laws of the State will be invoked.

14. No one but those whose duties require it are to ride trips either upon the inside or outside of the mines, and all parties are warned to stay off haulways and incline while trips are moving.

15. Any one working for the company or upon their premises hereby accepts the Wage Scale and these Rules and Regulations as an agreement between themselves and this company, and the same can be altered or amended as conditions may warrant.

Witness our hands this 30th day of November, 1910.

MONTLAKE COAL COMPANY,
By CARL WHITE, *Pres.*

Approved: JOHN F. BOWDEN, *Pres.* Dist. No. 19, U. M. W. of A.
PAT CAREY, *Vice-Pres.* Dist. No. 19, U. M. W. of A.

CLASSIFICATION OF COAL MINES IN TENNESSEE

Section 9 of the Mining Code of Tennessee provides that "The maximum period that shall occur between inspections and examinations of each mine in this State, and the minimum quantity of fresh air that shall be supplied to each person and each animal employed in the mines of this State shall be governed by the following classification of mines, based upon the existing conditions heretofore, at present, or may appear in the future, in accordance with the conditions, jeopardizing human life and health in such mines. The classification shall be as follows:

Class A shall include every coal mine or other mine known to liberate fire damp (CH_4) at present or in the future, and all mines of this class shall be inspected by the chief inspector, or the district inspector, at least once every sixty (60) days; and the minimum amount of fresh air supplied to each person and animal employed in the mine, by the ventilating currents, shall be one hundred and fifty (150) cubic feet per minute for each person, and six hundred (600) cubic feet per minute for each animal employed in the mine at one time. At any time fire damp is discovered in the mine or mines of other classes the inspector may place such mine or mines in this class, and then it shall be subject to the restrictions herein prescribed for the operation of mines of such class. However, if the amount of fire damp is slight or limited, and the safety of employees is not endangered from such gas, the chief inspector may use his best judgment in changing the classification of such mine or mines; and any mine liberating sufficient fire damp to be detected on the flame of a modern test lamp, may, by action of the chief mine inspector, be placed in this class; and if changes are necessary in order that they may comply with this act, the chief inspector shall allot them a reasonable time to make such changes; and if he deems it necessary, he may remove a portion of or all the inside employes until such changes are made in accordance with the provisions of this Act. The minimum amount of fresh air required and specified may be increased by the chief inspector should he deem it necessary for the better protection of human life and health, as the conditions may require.

Class B shall include every coal or other mine that is dry and dusty to such an extent as, in the best judgment of the chief inspector, renders the same dangerous from dust explosions; and where coal or other dust is deposited on timbers, sides and bottoms of the airways, entries or other workings of the mine, and where danger would be increased by too great a velocity of the ventilating currents in mines of this class, the minimum amount of fresh air supplied by ventilating currents shall not be less than one hundred (100) cubic feet per minute for each person, and five hundred (500) cubic feet per minute for each animal employed in the mine at one time; and the chief inspector or a district inspector shall inspect and examine each mine of this class at least once every sixty (60) days, or oftener, and determine if the mine is operated under the restrictions of this Act and those governing mines of this class. The chief mine inspector shall have the right to classify the mines and determine to what class they shall belong.

Class C shall include every coal or other mine employing over twenty (20) persons and three (3) mules that is not at present or may in the future liberate sufficient fire damp to be detected on the flame of a modern test lamp, and has not been classed as a dry and dusty mine by the chief inspector of mines. The minimum quantity of fresh air that shall be supplied to each person employed

in the mine by the ventilating currents shall be eighty-five (85) cubic feet per minute, and for each animal employed in the mine it shall be five hundred (500) cubic feet per minute; and it shall be the duty of the chief mine inspector or a district inspector to inspect and examine each mine of this class at least once every ninety (90) days; and at any time conditions may require, the chief inspector may increase the quantity of fresh air to be supplied by ventilating currents, and when conditions may require, may change mines from one class to another by proper notice to all parties interested.

Class D shall include all coal or other mines working less than twenty (20) persons in which fire damp has not been discovered at any time, and which are not considered to be dry and dusty mines. This class of mines shall supply the same amount of fresh air by ventilating currents to persons working in same as required for Class C mines. Mines of this class shall be inspected every ninety (90) days by the chief inspector or a district inspector. The chief inspector shall have the authority to change the classification of mines of this class as the conditions may require to maintain them in proper classes.

Class E shall include all copper, iron ore, phosphate, lead or other minerals being mined by shaft, slope, drift or otherwise; and mines of this class shall be examined once every three (3) months by the chief mine inspector or a district inspector, and the amount of fresh air supplied by the ventilating currents for each person and animal employed shall be governed by the conditions therein, and in no case shall the quantity of the ventilating currents be increased over that of "Class A" mines; provided, however, that whenever any explosive gases are met with, the chief inspector shall fix the required amount of ventilating current per person.

DETAIL COAL MINE DATA

The following chapter gives detailed data of the coal mines in Tennessee, brought up to December 31, 1911, and including names and addresses of officials, classification, seam worked, details of haulage, ventilation, etc. It is arranged alphabetically as to counties and mines.

ANDERSON COUNTY.

Black Diamond No. 1 Mine—*Owner,* Black Diamond Coal Co., Knoxville; *Operator,* Black Diamond Coal Co., Knoxville; *President,* J. W. Borches, Knoxville; *Superintendent,* W. E. Hendren, Coal Creek; *Inside Foreman,* W. E. Hendren, Coal Creek.

This is a Class B drift mine. It is located in Cumberland Mountain, 1,024 feet above sea level, 3 miles from Coal Creek, and connects with the Southern Railroad. The Coal Creek seam is worked; it has an average thickness of 44 inches. The roof is slate and the bottom is fire clay and sandstone. It is developed on the double entry, room and pillar system. Ventilation is produced by a fan, 20 feet in diameter, and it is distributed as a continuous current. The coal is hauled by tail rope for a distance of 4,000 feet, gathering to siding with two 6-ton and two 31½-ton electric motors.

ANDERSON COUNTY.

Black Diamond No. 5 Mine—*Owner,* Coal Creek Mining & Mfg. Co., Knoxville; *Operator,* Black Diamond Coal Co., Knoxville; *President,* J. C. Lutrell, Knoxville; *Superintendent,* L. F. Card, Coal Creek; *Inside Foreman,* John Shark, Coal Creek.

This is a Class A slope mine. It is located in the Cumberland Mountain, 1,029 feet above sea level, three miles from Coal Creek. This mine connects with the Southern Railroad. The Coal Creek seam, having an average thickness of 44 inches, is worked. The roof is slate, and the bottom is composed of fire clay and sandstone. It is developed on the thribble main, double cross entry, room and pillar system. It is ventilated by a fan which has a diameter of 10 feet, and the ventilation is distributed by the split system. Haulage is conducted from rooms to sidetrack by mules, the distance being 1,400 feet; and from sidetrack to tipple, a distance of 3,800 feet, by tail rope.

ANDERSON COUNTY.

Brookside Mine—*Owner,* Royal Coal & Coke Co., Pless; *Operator,* Royal Coal & Coke Co., Pless; *President,* H. S. Pless, Pless; *Superintendent,* J. W. Goans, Pless; *Inside Foreman,* J. M. Stonecipher, Pless.

This is a Class B drift mine. It is located in Cumberland Mountain, 1,000 feet above sea level, ¼ mile from Pless. It connects with the Southern Railroad. The Coal Creek seam is worked; it has an average thickness of 50 inches. Both the roof and the bottom are slate. It is developed on the double entry system. Ventilation is produced by a fan 10 feet in diameter, and is distributed by continuous current. Haulage is conducted from inside to outside, a distance of 1,000 feet, by mules; and from outside to tipple, a distance of 400 feet, by mules.

ANDERSON COUNTY.

Buck Mountain Mine—*Owner,* Royal Coal & Coke Co., Pless; *Operator,* Royal Coal & Coke Co., Pless; *President* H. S. Pless, Pless; *Superintendent,* J. W. Goans, Pless; *Inside Foreman,* J. W. Stonecipher, Pless.

This is a Class A drift mine. It is located in Cumberland Mountain, 1,000 feet above sea level, 1¼ miles from Pless. It connects with Southern Railroad. The Coal Creek seam is worked; it has an average thickness of 50 inches. The roof of this mine is slate and clay, and the bottom is slate. It is developed on the double

entry system. Ventilation is produced by a fan, 10 feet in diameter, and is distributed by the split system. Haulage is conducted from headings to sidetrack, a distance of 1,000 feet, by mules; from sidetrack to outside, a distance of 2,000 feet, by rope; from outside to tipple, a distance of 400 feet, by mules.

ANDERSON COUNTY.

Cross Mountain No. 1 Mine—*Owner,* Coal Creek Mining & Mfg. Co., Knoxville; *Operator,* Knoxville Iron Co., Knoxville; *President,* T. I. Stephenson, Knoxville; *Superintendent,* P. F. Lynch, Briceville; *Inside Foreman,* George Bulmer, Briceville.

This is a Class B drift mine. It is located in the Cumberland Mountain, 1,006 feet above sea level, three miles from Coal Creek. It connects with the Southern Railroad. The Coal Creek seam is worked; it has an average thickness of 46 inches. The roof is slate, and the bottom is fire clay. This mine is developed on the entry and airway, double room system. It is ventilated with an electric fan, 7 feet in diameter. The ventilation is distributed by the split system. Six Jeffrey chain breast and two Sullivan short wall mining machines are used in this mine. Haulage is conducted from sidetrack to tipple, a distance of 7,000 feet, by motors; from rooms to sidetrack, a distance of 2,200 feet, by motors; from rooms to sidetrack, a distance of 2,200 feet, by mules; from rooms to sidetrack, a distance of 1,500 feet, by motors; from rooms to sidetrack, a distance of 2,000 feet, by mules; from rooms to sidetrack, a distance of 1,800 feet, by mules.

ANDERSON COUNTY.

Cross Mountain No. 3 Mine—*Owner,* Coal Creek Mining & Mfg. Co., Knoxville; *Operator,* Knoxville Iron Co., Knoxville; *President,* T. I. Stephenson, Knoxville; *Superintendent,* P. F. Lynch, Briceville; *Inside Foreman,* D. J. Ridings, Briceville.

This is a Class C drift mine. It is located in Cumberland Mountain, 1,006 feet above sea level, three miles from Coal Creek. It connects with the Southern Railroad. The Coal Creek seam is worked; it has an average thickness of 48 inches. The roof is slate and fire clay, and the bottom, fire clay. This mine is developed on the entry airway and single room system. It is ventilated by a furnace, with a grate area of 60 feet, and the ventilation is distributed by the split system. Haulage is conducted from the mouth of the mine to tipple, a distance of 1,000 feet, by mules; from rooms to sidetrack, a distance of 1,500 feet, by mules.

ANDERSON COUNTY.

Fraterville Mine—*Owner,* Coal Creek Mining & Mfg. Co., Knoxville; *Operator,* Coal Creek Coal Co., Knoxville; *President,* E. C. Camp, Knoxville; *Superintendent,* G. M. Camp, Knoxville; *Inside Foreman,* W. H. Branscomb, Coal Creek.

This is a Class B drift mine. It is located in Cumberland Mountain, 961 feet above the sea level, two miles from Coal Creek; it connects with the Southern Railroad. The Coal Creek seam, with an average thickness of 48 inches, is worked. The roof is slate, and the bottom is composed of slate and fire clay. This mine is developed on the single entry and room system. It is ventilated by a Crawford and McCrimmon fan, sixteen feet in diameter; the ventilation is distributed by the split system. Haulage is conducted from sidetrack to chute, a distance of 5,350 feet, by rope; from room to sidetrack, a distance of 3,800 feet, by mules.

ANDERSON COUNTY.

Middle Ridge Mine—*Owner,* Leath & Sawyer, Clinton; *Operator,* Tennessee Coal Co., Briceville; *President,* Geo. P. Chandler, Knoxville; *Superintendent,* E. F. Buffat, Briceville; *Inside Foreman,* Chas. Probert, Briceville.

This is a Class C drift mine. It is located in the foothills of the Cumberland Mountain, 975 feet above sea level, one mile from Briceville. It connects with the Southern Railroad. The Coal Creek seam, with an average thickness of forty-eight inches, is worked. The roof is composed of slate and clay, and the bottom, fire clay and slate. The mine is developed on the entry, room and pillar system. It is ventilated by natural means, and the ventilation is distributed by the entry and air-

way system. Haulage is conducted from the rooms to drum, a distance of 1,500 feet, by mules; and from drum to tipple, a distance of 716 feet, by gravity incline.

ANDERSON COUNTY.

Piedmont No. 2 Mine—*Owner,* Coal Creek Mining & Mfg. Co., Knoxville; *Operator,* Popular Creek Coal Co., Knoxville; *Superintendent,* W. H. Storrs, Oliver Springs; *Inside Foreman,* J. W. Williams, Oliver Springs.

This is a Class B mine, located in Cumberland Mountain, 1,100 feet above sea level, 4 miles from Oliver Springs; it connects with L. & N. Railroad. The Coal Creek seam is worked; it has an average thickness of 42 inches. The roof is slate and the bottom is fire clay. It is developed on the single entry system. Ventilation is produced by a fan seven feet in diameter, and is distributed by the split system. Haulage is conducted from mine to mouth, a distance of 4,000 feet, by rope; and from mouth to tipple, a distance of 1,000 feet, by mules. This mine was not in operation during the latter part of the year.

ANDERSON COUNTY.

Piedmont No. 4 Mine—*Owner,* Coal Creek Mining & Mfg. Co., Knoxville; *Operator,* Popular Creek Coal Co., Knoxville; *Superintendent,* W. H. Storrs, Oliver Springs; *Inside Foreman,* J. W. Williams, Oliver Springs.

This is a Class B mine. It is located in Cumberland Mountain, 4 miles from Oliver Springs; it connects with the L. & N. Railroad. The elevation is 1,100 feet above sea level. The Coal Creek seam is worked; it has an average thickness of 45 inches. The roof is slate, and the bottom is fire clay. It is developed on the single entry system. Ventilation is produced by furnace with a grate area of 36 feet, and is distributed by the split system. Haulage is conducted from mine to knuckle, a distance of 4,000 feet, by mules; and from knuckle to tipple, a distance of 300 feet, by gravity. This mine was not worked during the latter part of the year.

ANDERSON COUNTY.

Taft Mine—*Owner,* Coal Creek Mining & Mfg. Co., Knoxville; *Operator,* Coal Creek Coal Co., Knoxville; *President,* H. W. Camp, Knoxville; *Superintendent,* G. M. Camp, Knoxville; *Inside Foreman,* W. H. Branscomb, Coal Creek.

This is a Class C drift mine. It is located in the Cumberland Mountain, 1,025 feet above the sea level, two and a half miles from Coal Creek. It connects with the Southern Railroad. The Coal Creek seam is worked, and has an average thickness of 60 inches. The roof is slate, and the bottom is composed of slate and fire clay. It is developed on the single entry and room system. The mine is ventilated without artificial methods. Haulage is conducted in No. 1 from rooms to chute, a distance of 1,100 feet, by mules; from incline to chute, a distance of 200 feet, by rope; in No. 2, from rooms to chute, a distance of 2,400 feet, by mules.

ANDERSON COUNTY.

Tennessee Mine—*Owner,* Coal Creek Mining & Mfg. Co., Knoxville; *Operator,* Tennessee Coal Co., Briceville; *President,* Geo. P. Chandler, Knoxville; *Superintendent,* E. F. Buffat, Briceville; *Inside Foreman,* H. H. Braden, Briceville.

This is a Class B drift mine. It is located in the Cumberland Mountain, 972 feet above sea level, one mile from Briceville. It connects with the Southern Railroad. The Coal Creek seam is worked. The average thickness of the seam is 48 inches. The roof of the mine is slate and shale, and the bottom is fire clay and slate. It is developed on the double entry, room and pillar system. It is ventilated by a fan, 16 feet in diameter. The ventilation is distributed by the double entry system. Haulage is conducted from rooms to sidetracks, a distance of 1,000 feet, by mules; and from sidetracks to tipple, a distance of 9,000 feet, by electric power. Seven Ingersoll mining machines are used in this mine.

ANDERSON COUNTY.

Thistle Mine—*Owner,* Coal Creek Mining & Mfg. Co., Knoxville; *Operator,* Coal Creek Coal Co., Knoxville; *President,* E. C. Camp, Knoxville; *Superintendent,* G. M. Camp, Knoxville; *Inside Foreman,* W. H. Branscom, Coal Creek.

This is a Class B drift mine. It is located in the Cumberland Mountain 1,011

feet above the sea level, three from Coal Creek. It connects with the Southern Railroad. The Coal Creek seam, with an average thickness of 48 inches, is worked. The roof is slate, and the bottom slate and fire clay. This mine is developed on the single entry and room system. Ventilation is produced by a Crawford and McCrimmon fan, 16 feet in diameter, and is distributed by the split system. Haulage is conducted from rooms to sidetrack, a distance of 4,000 feet, by mules; and then from sidetrack to chute, a distance of 5,212 feet, by mules.

ANDERSON COUNTY.

Wind Rock No. 1 Mine—*Owner,* Bessemer Coal, Iron & Land Co., Birmingham, Ala.; *Operator,* Wind Rock Coal & Coke Co., Wind Rock; *President,* H. L. Badham, Birmingham, Ala.; *Superintendent,* W. G. Srodes, Wind Rock; *Inside Foreman,* Tom Doyle, Wind Rock.

This is a Class C drift mine. It is located in Wind Rock Mountain, 2,400 feet above sea level, three miles from Oliver Springs. It connects with the Louisville & Nashville Railroad. The Dean seam is worked; it has an average thickness of 57 inches. The roof is sandstone, and the bottom is fire clay. It is developed on the room and pillar system. It is ventilated by fan 6 feet in diameter, and the ventilation is distributed by the split system. Haulage is conducted from working faces to upper tipple by motor, the distance being 6,000 feet; from upper tipple to lower tipple, a distance of 4,500 feet, by monitor. Seven mining machines are used; five Shortwall and Sullivan and two Goodman Breast.

BLEDSOE COUNTY.

Atpontley No. 6 Mine—*Owner,* Atpontley Coal Co., Chattanooga; *President,* John B. Atkinson, Earlington, Ky.; *Operator,* Polk Creek Coal Co., Chattanooga; *Superintendent,* C. B. Finley, Chattanooga; *Inside Foreman,* Robert J. Hoge, Atpontley.

This is a Class C drift mine, located in Cumberland Mountain, on the west side of Sequatchie Valley, ¾ of a mile west of Atpontley, and 1,600 feet above sea level. The Sewanee seam, having an average thickness of 3 feet, is worked. The roof is slate, and the bottom fire clay. It is developed on the single entry, room and pillar system, and is shot from the solid with black powder. Ventilation is produced by a 6 foot disc fan, propelled by steam, and is conducted on the continuous current; it is not well distributed in the headings. Coal is hauled from rooms to head of short incline on the outside by mules; then lowered down this incline, a distance of 400 feet to head of main incline by small gravity drum; from head of main incline to tipple, a distance of 4,004 feet, by drum and rope; and from tipple to College Station on N., C. & St. L. R. R., a distance of 3 miles, by locomotives on branch line.

CAMPBELL COUNTY.

The Anchor Mine—*Owner,* J. F. Hefferman, Jellico; *Operator,* The Anchor Coal Co., Morley; *President,* J. D. Raht, Knoxville; *Superintendent,* H. D. Rankin, Morley; *Inside Foreman,* J. H. Richards, Morley.

This is a Class C drift mine. It is located in White Oak Mountain, ¾ of a mile from Morley, 1,373 feet above sea level. This mine connects with the L. & N. Railroad. The White Oak seams No. 1 and No. 2, with average thickness of 72 inches, are worked. Both the roof and the bottom are slate. It is developed on the double entry system. It is ventilated by two fans, 8 feet in diameter. The ventilation is distributed by the continuous current system. Haulage is conducted from face to knuckle, a maximum distance of 4,000 feet, by mules; from knuckle to tipple, a distance of 600 feet, by gravity incline.

CAMPBELL COUNTY.

Baird B. G. Mine—*Owner,* Lewis Baird,Elk Valley; *Operator,* Lewis Baird, Elk Valley; *Superintendent,* Lewis Baird, Elk Valley; *Inside Foreman,* Aaron Baird, Elk Valley.

This is a Class C drift mine. It is located in Jellico Mountain, one mile from Elk Valley. The elevation is 1,250 feet above sea level. It connects with the Southern Railroad. The B. G. seam is worked; its average thickness is 20 inches. The roof is sandstone and slate, and the bottom is slate. It is developed on the room

and pillar system. Ventilation is produced by an air shaft. Haulage is conducted from entry to cars by mules; then it is conveyed by tramway.

CAMPBELL COUNTY.

Bear Wallow Mine—*Owner,* Bear Wallow Coal & Coke Co., Knoxville; *Operator,* Bear Wallow Coal Co., Caryville; *President,* H. B. Bowling, Clinton; *Superintendent,* A. H. Bowling, Caryville; *Inside Foreman,* Ed Allen, Caryville.

This is a Class A slope mine. It is situated in the Cumberland Mountain, ½ mile from Caryville. The elevation is 1,050 feet above sea level. This mine connects with the Southern Railroad. The Coal Creek seam is worked, the average thickness is 42 inches. The roof is slate and sandstone, and the bottom is slate. It is developed on the single entry system, and is ventilated by a fan 6 feet in diameter. The ventilation is distributed by the continuous current system. Haulage is conducted from heading to bottom of slope, a distance of 2,700 feet, by motor; from bottom of slope to top of trestle, a distance of 250 feet, by rope. They are now installing an automatic chain haul from bottom of slope to knuckle that will handle cars separately, and return them empty to mine on separate track. They use two Sullivan & Rowen pillar mining machines.

CAMPBELL COUNTY.

Block No. 2 Mine—*Owner,* Block Coal & Coke Co., Block; *Operator,* Block Coal & Coke Co., Block; *President,* Robt. Wedekind, Loisville, Ky.; *Superintendent,* John Gorman, Block; *Inside Foreman,* M. K. Marlow, Block.

This is a new drift mine, and belongs to Class C. It is located in Cross Mountain, 2,600 feet above sea level, one mile from Block. It connects with the Southern Railroad. The Red Ash seam is worked; the average thickness is 36 inches. The top is slate, and the bottom is clay. It is developed on the single entry system. Ventilation is by natural means. Cars are trammed from faces to tipple by hand, and dumped into chutes at Monarch incline, which delivers coal to railroad cars.

CAMPBELL COUNTY.

Block Monarch Mine—*Owner,* Block Coal & Coke Co., Block; *Operator,* Block Coal & Coke Co., Block; *President,* Robt. Wedekind, Block; *Superintendent,* John Gorman, Block; *Inside Foreman,* W. M. Comer, Block.

This is a Class B drift mine. It is situated in Cross Mountain, 2,700 feet above sea level, at Block. It connects with the Southern Railroad. The Monarch seam is worked; it has an average thickness of 66 inches. The top is slate, and the bottom is slate. This mine is equipped with air machines and electric motor haulage. The coal is delivered to top house by motor cars where it is dumped into 12-ton monitor cars and lowered by railway cars on incline 4,730 feet in length.

CAMPBELL COUNTY.

Blue Gem Mine—*Owner,* Blue Gem Coal Co., Jellico; *Operator,* Blue Gem Coal Co., Jellico; *President,* J. E. Moses, Louisville, Ky.; *Superintendent,* Jas. F. MacPherson, Jellico; *Inside Foreman,* Jas. Haywood, Jellico.

This is a Class B drift mine. It is situated in Pine Mountain, one mile from Jellico. The elevation is 1,000 feet above sea level. It connects with the Southern Railroad. The Blue Gem seam is worked; it has an average thickness of 26 inches. The roof is slate, and the bottom is fire clay. It is developed on the room and pillar system. This mine is ventilated by a furnace with a 4½x10 ft. grate. Haulage is conducted from entry No. 1 to knuckle by mules, the distance being 1,500 feet; from entry Thomas to knuckle, a distance of 2,000 feet, by mules; from entry Elliott to knuckle, a distance of 2,400 feet, by mules; from entry Childs to knuckle, by mules, being a distant of 2,400 feet.

CAMPBELL COUNTY.

Cambria Mine—*Owner,* The Royal Coal & Coke Co., Knoxville; *Operator,* The Royal Coal & Coke Co., Knoxville; *President,* H. S. Pless, Knoxville; *Superintendent,* W. A. Pless, Coal Creek; *Inside Foreman,* Charles Bell, Coal Creek.

This is a Class A drift mine. It is located in the Cumberland Mountain, 1,136 feet above sea level, three miles from Coal Creek; it connects with Southern Rail-

road. The Coal Creek seam is worked; it has an average thickness of 40 inches. The roof is fire clay and slate, and the bottom is fire clay. It is developed on the double entry, room and pillar system. Ventilation is produced by a fan with a diameter of 20 feet, and is distributed by the split system. Haulage is conducted from rooms to sidetrack, a distance of 2,500 feet, by mules; and from sidetrack to chute, a distance of 4,200 feet by rope.

CAMPBELL COUNTY.

Caryville Mine—*Owner,* Caryville Coal Co., Caryville; *Operator,* Caryville Coal Co., Caryville; *President,* Thos. H. Gill, Milwaukee, Wis.; *Superintendent,* J. H. McManaman, Caryville; *Inside Foreman,* J. W. Duncan, Caryville.

This is a Class C drift mine. It is located in Cumberland Mountain, two miles from Caryville. The elevation is 2,445 feet above sea level. It connects with the Southern Railroad. The Red Ash seam, with an average thickness of 45 inches, is worked. Both the roof and the bottom are slate. This mine is developed on the room and pillar system. It is ventilated by a fan 8 feet in diameter, and the ventilation is distributed by the continuous current system. Haulage is conducted from Head 13L to sidetrack by mules, the distance being 2,400 feet; from Head 12R to sidetrack, a distance of 2,000 feet, by mules; from Head 6L to sidetrack by mules, the distance being 300 feet. From the sidetrack to tipple, haulage is conducted by steam, the distance is 2,000 feet.

CAMPBELL COUNTY.

Chaska Mine—*Owner,* Chaska Coal Co., Knoxville and Chaska; *Operator,* Chaska Coal Co., Knoxville and Chaska; *President,* F. B. Cooley, Sr., Knoxville and Chaska; *Superintendent,* W. M. Sexton, Knoxville and Chaska; *Inside Foreman,* J. W. Payne, Knoxville and Chaska.

This is a Class C mine. It is located in a spur of Rich Mountain, one mile from Chaska; the elevation is 1,400 feet above sea level. It connects with the Louisville & Nashville Railroad. The Rich Mountain seam is worked; it has an average thickness of 40 inches. The roof is composed of fire clay and soapstone, and the bottom of fire clay. It is developed on the single entry system. It is ventilated by a furnace with a grate area of 25 square feet. The ventilation is distributed by the continuous system. Haulage is conducted from mine to knuckle by motor, the distance being 4,400 feet; from rooms to motor siding, a distance of 1,000 feet, by mules; from knuckle to tip houses, by incline, the distance being 750 feet.

CAMPBELL COUNTY.

Davis Creek No. 2 Mine—*Owner,* G. W. Parrott, Atlanta, Ga.; *Operator,* Davis Creek Coal Co., Cupp; *President,* G. W. Parrott, Atlanta, Ga.; *Superintendents,* Bert Facinoli and I. Livingston, Cupp; *Inside Foremen,* Chas. Grimes and Sam Gray, Cupp.

This is a Class D drift mine; it is located in Rich Mountain, 1,975 feet above sea level, ½ mile from Cupp; it connects with the L. & N. Railroad. The Rich Mountain or Remy seam is worked; it has an average thickness of 32 inches. The roof is slate and the bottom is fire clay. It is developed on the single entry system. It is ventilated by furnace, with a grate area of 25 feet; the ventilation is distributed by the continuous current system. Haulage is conducted from room to knuckle I, a distance of 1,000 feet, by mules; from knuckle I to bottom of incline, a distance of 800 feet, by gravity; and from knuckle II to chute, a distance of 100 feet, by gravity. This mine was not in operation during year.

CAMPBELL COUNTY.

Davis Creek No. 1 Mine—*Owner,* G. W. Parrott, Atlanta; *Operator,* Davis Creek Coal Co., Cupp; *President,* G. W. Parrott, Cupp; *Superintendent,* I. Livingston, Cupp; *Inside Foreman,* John Facinola, Cupp.

This is a Class C drift mine. It is located in Cumberland Mountain, 1,975 feet above sea level, ½ mile from Cupp; it connects with L. & N. Railroad. The Rich Mountain or Remy seam is worked. It has an average thickness of 34 inches. The roof is slate and the bottom is fire clay. It is developed on the single entry system. It is ventilated by a furnace with a grate area of 25 feet; the ventilation is distributed by the continuous current system. Haulage is conducted from room to

knuckle I, a distance of 1,000 feet, by mules; from knuckle I to bottom of incline, a distance of 750 feet by rope; from bottom of incline to knuckle II, a distance of 200 feet, by gravity; and from knuckle II to tipple, a distance of 100 feet, by rope. This mine was not in operation during year.

CAMPBELL COUNTY.

Elkhart Mine—*Owner,* Elkhart Blue Gem Coal Co., Elk Valley; *Operator,* Elkhart Blue Gem Coal Co., Elk Valley; *President,* G. P. Norman, Briceville; *Superintendent,* A. S. Lindsay, Gatliff; *Inside Foreman,* A. S. Lindsay, Gatliff.

This is a Class D drift mine. It is located in Jellico Mountain, eleven miles from Jellico. The elevation is 2,100 feet above sea level; it connects with the Southern railroad. The Blue Gem seam, with an average thickness of 20 inches, is worked. The roof is composed of sandstone and slate, and the bottom of rock. This mine is developed on the single entry system. It is ventilated by natural means. Haulage is conducted from main entry to coal chute, a distance of 350 feet, by mules; from coal chute to chute at railroad, a distance of 1,500 feet, by mules. This mine has not been worked for a year.

CAMPBELL COUNTY.

Elk Valley Mine—*Owner,* Elk Valley Coal & Iron Co., Jacksboro; *Operator,* Elk Valley Jellico Coal Co., Jacksboro; *President,* J. M. Biber, Jacksboro; *Superintendent,* D. W. Parrott, Jacksboro; *Inside Foreman,* E. L. Robinson, Jacksboro.

This is a Class C drift mine. It is located in Jellico Mountain, two miles from Elk Valley. The elevation is 1,600 feet above sea level, this mine connects with the Southern Railroad. The Splint seam is worked; it has an average thickness of 36 inches. The roof is composed of slate, and the bottom of fire clay. This mine is developed on the room and pillar system. It is ventilated by a furnace with 15 feet grate area. Haulage is conducted from room to outside by mules; from splint to tipple, a distance of 8,000 feet, haulage is conducted by locomotive. Four Ingersoll mining machines are used in the mine.

CAMPBELL COUNTY.

Evans Mine—*Owner,* Evans Coal Co., Jellico; *Operator,* Evans Coal Co., Jellico; *President,* P. F. Gorman, Jellico; *Superintendent,* P. F. Gorman, Jellico; *Inside Foreman,* P. F. Gorman, Jellico.

This is a Class C drift mine. This mine is located 1½ miles from Jellico on the Southern Railroad. The Blue Gem seam is worked, and has an average thickness of 24 inches. The roof is slate, and the bottom is slate. The mine is developed on the single entry system. It is ventilated by a furnace with a grate area of 24 feet. Haulage is conducted from face to knuckle, a distance of 3,500 feet, by mules; from knuckle to railroad, a distance of 300 feet, by incline.

CAMPBELL COUNTY.

Falls Branch Mine—*Owner,* Falls Branch Coal Co., Wooldridge; *Operator,* Falls Branch Coal Co., Wooldridge; *President,* P. Wooldridge, Pewee Valley, Ky.; *Superintendent,* Wm. Dinkelaker, Wooldridge; *Inside Foreman,* J. W. Howe, Wooldridge.

This is a Class C drift mine. It is located in Jellico Mountain, two miles from Wooldridge. The elevation is 1,250 feet above sea level. This mine connects with the Southern Railroad. The Jellico seam is worked; it has an average thickness of 40 inches. The roof is slate, and the bottom is fire clay. The single and double entry system is used in its development. Ventilation is produced by a fan with a diameter of 8 feet, and the ventilation is distributed by the split system. Haulage is conducted from rooms to No. 3 sidetrack, by mules, the distance being 1,500 feet; from No. 3 sidetrack to No. 2 sidetrack, a distance of 1,900 feet, by gas motor; from No. 2 sidetrack to outside track, by engine, the distance being 2,500 feet; from outside track to knuckle, a distance of 10,560 feet, by engine.

CAMPBELL COUNTY.

Gem Mine—*Owner,* LaFollette Coal, Iron & Railway Co., LaFollette; *Operator,* LaFollette Coal, Iron & Railway Co., LaFollette; *President,* H. M. LaFollette, LaFollette; *Superintendent,* W. S. Wilson, LaFollette; *Inside Foreman,* H. D. Hufstetter, LaFollette.

This is a Class C drift mine. It is located in Rock Creek Mountain, ¾ of a mile from Peabody; its elevation is 1,986 feet above sea level; it connects with the L. & N. Railroad. The Jordan seam is worked; it has an average thickness of 50 inches. The roof is slate, and the bottom is fire clay. It is developed on the double entry, room and pillar system. Ventilation is produced by fan and furnace. The fan is 6 feet in diameter, and the furnace has a grate area of 48 feet; it is distributed by the split system. Haulage is conducted from face to incline, a distance of 6,600 feet, by electric motors; from top incline to tipple, a distance of 4,000 feet, by endless rope.

CAMPBELL COUNTY.

Indian Mountain Mine—*Owner,* East Tennessee Coal Co., Knoxville; *Operator,* Proctor Coal Co., Red Ash, Ky.; *President,* Chas. Finley, Williamsburg, Ky.; *Superintendent,* Philip Francis, Jellico; *Inside Foreman,* J. P. Alred, Red Ash, Ky.

This is a Class C drift mine, located 1,300 above sea level, in Indian Mountain, 2½ miles from Jellico, and connects with the L. & N. and the Southern Railroads. The Jellico seam is worked; it has an average thickness of 40 inches. The roof is slate, and the bottom is fire clay. It is developed on the single entry system. Ventilation is produced by a fan, 11 feet in diameter, and is distributed by the split system. Haulage is conducted from head room to entry, a distance of 150 feet, by men; from entry to sidetrack, a distance of 800 feet, by mules; from sidetrack to outside, a distance of 1,200 feet, by motor; from head room to entry, a distance of 150 feet, by men; from entry to outside, a distance of 2,500 feet, by motors.

CAMPBELL COUNTY.

Italian Blue Gem Mine—*Owner,* Italian Blue Gem Coal Co., Newcomb; *Operator,* Zechini Coal Co., Newcomb; *President,* Peter Zechini, Newcomb; *Superintendent,* Peter Zechini, Newcomb; *Inside Foreman,* W. A. Braden, Newcomb.

This is a Class C drift mine. It is located in Pine Mountain, two miles from Newcomb. Its elevation is 1,200 feet above sea level. The Blue Gem seam, with an average thickness of 22 inches, is worked. The roof is slate, and the bottom is slate and fire clay. It is developed on the single entry and double room system. Ventilation is produced by a fan, 4 feet in diameter, and is distributed by the airway system. Haulage is conducted from room to drum, a distance of 4,000 feet, by mules; from drum to shute and railroad, a distance of 1,150 feet, by gravity.

CAMPBELL COUNTY.

Jackson Mine—*Owner,* Campbell Coal Mining Co., Westbourne; *Operator,* Campbell Coal Mining Co., Westbourne; *President,* Walter H. Finley, Westbourne; *Superintendent,* W. A. Yeager, Westbourne; *Inside Foreman,* Richard Rigby, Westbourne.

This is a Class C drift mine. It is located in Rich Mountain, ¼ of a mile from Westbourne. The elevation is 1,000 feet above sea level. It connects with the Southern Railroad. The Log Mountain seam is worked; it has an average thickness of 48 inches. The roof is composed of sandstone and slate, and the bottom of fire clay and slate. This mine is developed on the room and pillar system. Ventilation is furnished by a furnace which has a grate area of 64 square feet. Haulage is conducted from working face to sidetrack, by mules, the distance being 1,000 feet; from sidetrack to knuckle, a distance of 1,500 feet, by motor; from knuckle to railroad, a distance of 800 feet, by gravity incline.

CAMPBELL COUNTY.

Jellico B. G. Mine—*Owner,* E. Jameson Jones, Jellico; *Operator,* H. M. Jones Coal Co., Jellico; *President,* J. S. Jones, Jellico; *Superintendent,* H. M. Jones, Jellico; *Inside Foreman,* H. M. Jones, Jellico.

This is a Class B drift mine. It is located in Pine Mountain, 2 miles from Jellico; its elevation is 1,200 feet above sea level; it connects with the Southern Rail-

road. The Blue Gem seam is worked; it has an average thickness of 24 inches. The roof is slate, and the bottom is slate and fire clay. It is developed on the single entry and airway system. Ventilation is produced by a furnace with a 6x8 grate area, and is distributed by the break through system. Haulage is conducted from heading to sidetrack, a distance of 400 feet, by mules; from sidetrack to drum, a distance of 400 feet, by mules; from drum to tipple, a distance of 1,400 feet, by rope.

CAMPBELL COUNTY.

Jellico Cannel Mine—*Owner,* Jellico Cannel Co., Newcomb; *Operator,* Jellico Cannel Co., Newcomb; *President,* Thos. N. Mordue, Chicago, Ill.; *Superintendent,* W. H. Buck, Newcomb; *Inside Foreman,* W. H. Buck, Newcomb.

This is a Class C drift mine. It is situated 2 miles from Newcomb, on the Southern Railroad. The Cannel seam, with an average thickness of 30 inches, is worked. It is developed on the single entry and airway plan. The elevation of the seam is 1,800 feet above sea level. The roof is slate, and the bottom is slate. Ventilation is produced by a fan 4 feet in diameter, and is distributed by the continuous current system. Haulage is conducted from the faces to upper knuckle, a distance of 2,800 feet, by mules; then it is lowered to Jellico level by plane 1,300 feet long; then it is trammed to lower knuckle 4,000 feet, when the mine cars are lowered by incline 1,000 feet to tipple and cars.

CAMPBELL COUNTY.

Kimberly Mine—*Owner,* Kimberly Mining & Mfg. Co., Cupp; *Operator,* Kimberly Mining & Mfg. Co., Cupp; *President,* George P. Chandler, Knoxville; *Superintendent,* C. R. Brooks, Cupp; *Inside Foreman,* Andrew Paris, Cupp.

This is a Class C drift mine. It is located in the Cumberland Mountain, 1,555 feet above sea level; it connects with the L. & N. Railroad. The Rich Mountain seam is worked; it has an average thickness of 40 inches. The roof is slate and sandstone, and the bottom is clay. The mine is developed on the entry and airway system. Ventilation is produced by a fan 6 feet in diameter, and is distributed by the split current system. Mining is done by electricity, and haulage is conducted from face to tipple, a distance of 4,000 feet by motors; from main heading to knuckle, a distance of 4,750 feet, by motors; then the mine cars are lowered by incline, 750 feet in length, to railway cars.

CAMPBELL COUNTY.

Marion-Anna Mine—*Owner,* Wooldridge Jellico Coal Co., Wooldridge; *Operator,* Wooldridge Jellico Coal Co., Wooldridge; *President,* P. Wooldridge, Pewee Valley, Ky.; *Superintendent,* Wm. Dinkelaker, Wooldridge; *Inside Foreman,* Thos. H. Griffith, Wooldridge.

This is a Class C drift mine. It is located in Jellico Mountain, 1,225 feet above sea level, 2¾ miles from Newcomb; it connects with the Southern Railroad. The Jellico seam is worked; it has an average thickness of 36 inches. The roof is slate and the bottom is fire clay. It is developed on the single entry and double room system. Ventilation is produced by a fan 8 feet in diameter, and it is distributed by the direct current system. Haulage is conducted from rooms to right sidetrack, a distance of 500 feet, by mules; from sidetrack to general sidetrack, a distance of 2,000 feet, by motor; from sidetrack to knuckle, a distance of 300 feet, by mules.

CAMPBELL COUNTY.

Morley Mine—*Owner and Operator,* Morley Coal Co., Knoxville; *President,* W. F. Park, Knoxville; *Secretary,* J. M. Hartman, Knoxville; *Superintendent,* J. C. Kranz, Knoxville; *Inside Foreman,* George Easler, Morley.

This is a Class C drift mine, located 1,300 feet above sea level, in Cumberland Mountain, 3½ miles from Jellico, and connects with L. & N. Railroad. The Kramor seam, having an average thickness of 34 inches, is worked. The roof is slate, and the bottom clay. It is developed on the single entry, room and pillar system. Ventilation is produced by furnace with a grate area of 32 feet, and is distributed as continuous current. Haulage is conducted from rooms to entrance, a distance of 600 feet, by mules; and from entrance to tipple, a distance of 800 feet, by incline. This mine was not in active operation during the year 1911.

CAMPBELL COUNTY.

Newcomb Blue Gem Mine—*Owner, Operator, Superintendent, etc.* I. L. Wilson, Newcomb, Tenn.

This is a Class E drift mine. It is located 1,200 feet above sea level, in Long Mountain, ½ mile from Newcomb. It connects by wagon haul with Southern Railroad. The Blue Gem seam is worked; it has an average thickness of 26 inches. The roof is slate, and the bottom is slate and sand mixture. It is developed on the double entry, and is connected with old works. It has natural ventilation. Haulage is conducted from inside to tipple, a distance of 575 feet, by mules.

CAMPBELL COUNTY.

Newman Mine—*Owner, Operator and Superintendent,* A. T. Newman, Jellico.

This is a Class D drift mine. It is located in Jellico Mountain, 1 mile from Jellico; the elevation is 1,200 feet above sea level. It connects with the Southern and the L. & N. Railroads. The Blue Gem seam is worked; it has an average thickness of 28 inches. The roof is slate, and the bottom is fire clay. It is developed on the single entry system. It is ventilated by a furnace with a grate area of 24 feet. Haulage is conducted from rooms to mine entrance, a distance of 100 feet, by mules. This mine was not in operation during the year.

CAMPBELL COUNTY.

New Royal Mine—*Owner,* Royal Coal & Coke Co., Knoxville; *Operator,* Royal Coal & Coke Co., Knoxville; *President,* H. S. Pless, Coal Creek; *Superintendent,* W. A. Pless, Coal Creek; *Inside Foreman,* Charles Bell, Coal Creek.

This is a Class B drift mine. It is located 3 miles from Coal Creek, and is connected with the Southern Railroad. The Coal Creek seam is worked; one main entry driven to mine coal between the Old Royal mine and the crop. The average thickness of the seam is 42 inches. The roof is slate mixed with clay, and the bottom is slate. Haulage is conducted from entrance of mine to top of incline by mules; from incline to tipple, is a distance if 200 feet.

CAMPBELL COUNTY.

Perkins Branch Mine—*Owner,* Perkins Branch Blue Gem Coal Co., Elk Valley; *Operator,* Perkins Branch Blue Gem Coal Co., Elk Valley; *President,* M. L. Beard, Elk Valley; *Superintendent,* Ewel Beard, Elk Valley; *Inside Foreman,* Ewel Beard, Elk Valley.

This is a Class C drift mine. It is situated 1½ miles from Elk Valley, on the Southern Railroad. The Blue Gem seam is worked; it has an average thickness of 22 inches. The top and bottom are both slate. This mine is developed on the single entry system. Ventilation is produced by furnace, and is distributed by continuous current. Coal is hauled from face to chute by mules.

CAMPBELL COUNTY.

Powhatan Mine—*Owner,* Falls Branch Coal Co., Wooldridge; *Operator,* Falls Branch Coal Co., Wooldridge; *President,* P. Wooldridge, Pewee Valley, Ky.; *Superintendent,* Wm. Dinkelaker, Wooldridge; *Inside Foreman,* J. W. Howe, Wooldridge.

This is a Class C drift mine. It is located in Jellico Mountain, 1½ miles from Wooldridge. The elevation is 1,160 feet above sea level. This mine connects with the Southern Railroad. The Blue Gem seam is worked; it has an average thickness of 24 inches. The roof is slate, and the bottom is fire clay. It is developed on the single entry system. Ventilation is produced by natural means. Haulage is conducted from rooms to knuckle, by mules, the distance being 3,000 feet.

CAMPBELL COUNTY.

Red Ash Mine—*Owner,* East Tennessee Iron & Coal Co., Knoxville; *Operator,* Red Ash Coal Co., Caryville; *President,* C. M. Moore, Caryville; *Superintendent,* T. D. Richards, Caryville; *Inside Foreman,* D. W. Steadman, Caryville.

This is a Class C drift mine. It is located in the Cumberland Mountain, 2,450 feet above sea level, 1 mile from Caryville. It connects with the Southern Railroad. The Red Ash seam is worked, and has an average thickness of 42 inches. The

roof is slate, and the bottom is slate and fire clay. It is developed on the double entry system. This mine is ventilated by a fan 4 feet in diameter, and the ventilation is distributed by the continuous current system. Haulage is conducted from face of entries to sidetrack, a distance of 2,500 feet, by electric motor; from sidetrack to tipple, a distance of 1,800 feet, by motor; from tipple to railroad, a distance of 6,200 feet, by monitor cars.

CAMPBELL COUNTY.

Remy Mine—*Owner,* Remy Coal Co., Gatliff; *Operator,* Remy Coal Co., Gatliff; *President,* J. D. Wheeler, Gatliff; *Superintendent,* J. D. Wheeler, Gatliff; *Inside Foreman,* A. B. Lindsay, Gatliff.

This is a Class C drift mine. It is located in Log Mountain, 1,578 feet above sea level, ½ mile from Gatliff. It connects with the L. & N. Railroad. The Rich Mountain seam is worked; it has an average thickness of 36 inches. The roof and the bottom are slate. The double and single entry systems are used in the development of this mine. Ventilation is produced by a fan 4 feet in diameter, and is distributed by the airway and break through system. Haulage is conducted from sidetrack No. 2 to sidetrack No. 1, a distance of 700 feet, by mules; from sidetrack No. 1 to knuckle, a distance of 1,000 feet, by mules; from knuckle to tipple, a distance of 900 feet, by incline.

CAMPBELL COUNTY.

Rex No. 1 Mine—*Owner,* LaFollette Coal, Iron & Railway Co., LaFollette; *Operator,* LaFollette Coal, Iron & Railway Co., LaFollette; *President,* H. M. LaFollette, LaFollette; *Superintendent,* H. Bevin, LaFollette; *Inside Foreman,* Abe Goins, LaFollette.

This is a Class A slope mine, located 1,180 feet above sea level, in Cumberland Mountain, 1 mile from LaFollette; it connects with the L. & N. and the Southern Railroads. The Rex seam, having an average thickness of 40 inches, is worked. The roof is slate, and the bottom is slate and fire clay. It is developed on the panel system. Ventilation is produced by a fan 12 feet in diameter; and is distributed by the split system. Haulage is conducted from face to sidetrack, a distance of 2,000 feet, by mules; from sidetrack to foot of slope, a distance of 2,700 feet, by gasoline motors; from foot of slope to tipple, a distance of 2,150 feet, by rope.

CAMPBELL COUNTY.

Rex No. 2 Mine—*Owner,* LaFollette Coal, Iron & Railway Co., LaFollette; *Operator,* LaFollette Coal, Iron & Railway Co., LaFollette; *President,* H. M. LaFollette, LaFollette; *Superintendent,* Chas. Hoebel, LaFollette; *Inside Foreman,* Chas. Wood, LaFollette.

This is a Class A slope mine. It is located in the Cumberland Mountain, 1 mile from LaFollette. The elevation is 1,271 feet above sea level; it connects with the L. & N. and the Southern Railroads. The Rex seam is worked. It has an average thickness of 36 inches. The roof is slate, and the bottom is fire clay and slate. It was developed on the room and pillar system, but is now developed on the panel system. Ventilation is produced by fans with diameters of 6 and 12 feet respectively. Haulage is conducted from faces to sidetrack, a distance of 1,500 feet, by mules; from sidetrack to foot of slope, a distance of 2,800 feet, by mules; from foot of slope to tipple, a distance of 1,200 feet, by rope. The workings of Rex No. 1 and No. 2 are connected, although they are operated as separate mines.

CAMPBELL COUNTY.

Rich Mountain Mine—*Owners,* J. S. Bartlett and H. M. LaFollette, LaFollette; *Operators,* Rich Mountain Coal & Coke Co., LaFollette; *President,* E. M. Beasley, LaFollette; *Superintendent,* H. W. Tillery, LaFollette; *Inside Foreman,* W. S. Elliott, LaFollette.

This is a Class A drift mine. It is located in Rich Mountain, 1,270 feet above sea level, 11 miles from LaFollette; it connects with the L. & N. Railroad. The Rich Mountain seam is worked; it has an average thickness of 34 inches. The roof is slate, and the bottom is slate also. It is developed on the single entry system. Ventilation is produced by a fan 12 feet in diameter, and is distributed by the entries

and return airway system. Haulage is conducted from rooms to sidetrack, a distance of 975 feet, by mules; from sidetrack to tipple, a distance of 5,250 feet, by rope.

CAMPBELL COUNTY.

Rock Spring Mine—*Owner,* East Tennessee Iron & Coal Co., Knoxville; *Operator,* Rock Spring Coal Co., Knoxville; *President,* R. E. Miller, Atlanta, Ga.; *Superintendent,* G. W. Card, Turley; *Inside Foreman,* Paul Card, Turley.

This is a Class D drift mine. It is located in the Cumberland Mountain, 2,800 feet above sea level, 1½ miles from Turley. It connects with the Southern Railroad. The Dean seam is worked; it has an average thickness of 52 inches. Both the roof and the bottom are slate. It is developed on the room and pillar system. Ventilation is produced by a fan with a diameter of 8 feet, and is distributed by the split system. Haulage is conducted from headings to sidetrack, a distance of 1,200 feet, by motor; from mine to railroad, a distance of 5,600 feet by gravity.

CAMPBELL COUNTY.

Southern Nos. 1 & 2 Mine—*Owner,* Southern Coal & Coke Co., Gatliff; *Operator,* Southern Coal & Coke Co., Gatliff; *President,* Dr. A. Gatliff, Williamsburg, Ky.; *Superintendent,* A. V. Brown, Gatliff; *Inside Foreman,* G. W. Pickle, Gatliff.

This is a Class C drift mine. It is located in Brushy Mountain, 1,800 feet above sea level, ½ mile from Gatliff; it connects with the L. & N. Railroad. The Jordan seam is worked. It has an average thickness of 54 inches. The roof is sandstone and shale, and the bottom is fire clay. It is developed on the single entry and airway system. Ventilation is produced by a furnace with a grate area of 28 feet, and is distributed by direct current system. Haulage is conducted from rooms to No. 1 sidetrack, a distance of 2,400 feet, by mules; from No. 1 sidetrack to knuckle, a distance of 1,470 feet by gas motor; from rooms to Southern main sidetrack, a distance of 1,300 feet, by mules; from Southern main sidetrack to knuckle, a distance of 2,870 feet, by gasoline motor; from rooms to No. 3 sidetrack, a distance of 2,100 feet, by mules; from No. 3 sidetrack to knuckle, a distance of 1,300 feet, by gasoline motor; from knuckle to tipple, a distance of 1,200 feet, by incline.

CAMPBELL COUNTY.

Sun Mine—*Owner,* Sun Coal Co., Caryville; *Operator,* Sun Coal Co., Caryville; *President,* Peter Bauer, Beaver Dam, Wis.; *Superintendent,* J. H. Bowling, Caryville; *Inside Foreman,* Warren Card, Caryville.

This is a Class C drift mine. It is located in the Cumberland Mountain, 38 miles from Knoxville. The elevation is 2,429 feet above sea level; it connects with the Southern Railroad. The Block seam is worked; it has an average thickness of 42 inches. The roof is slate, and the bottom is shale. It is developed on the double entry, room and pillar system. Ventilation is produced by a fan 6 feet in Diameter, and is distributed by the two returns system. Haulage is conducted from rooms to sidetrack, a distance of 2,300 feet, by mules; from sidetrack to tipple, a distance of 2,500 feet, by rope; from tipple to railroad, a distance of 4,000 feet, by monitor.

CAMPBELL COUNTY.

Tennessee Jellico Mine—*Owner,* Tennessee Jellico Coal Co., Anthras; *Operator,* Tennessee Jellico Coal Co., Anthras; *President,* Dr. Robt. Wedekind, Knoxville; *Superintendent,* John P. Gorman, Jellico; *Inside Foreman,* P. F. Gorman, Jr., Anthras.

This is a Class B drift mine. It is located in the Cumberland Mountain, 1,400 feet above sea level; it is ½ mile from Anthras, and connects with the L. & N. and the Southern Railroads. The Jellico seam is worked, having a thickness of 52 inches. The roof is slate, and the bottom is slate and stone. It is developed on the double entry, room and pillar system. Ventilation is produced by furnace, with a grate area of 60 feet, and is distributed by the continuous current system. Haulage is conducted from rooms to main entrance, a distance of 1,000 feet, by mules; from main entrance to tipple, a distance of 2,000 feet, by locomotive.

CAMPBELL COUNTY.

Westbourne Mine—*Owner,* Westbourne Coal Co., Westbourne; *Operator,* Westbourne Coal Co., Westbourne; *President,* Walter H. Finley, Westbourne; *Superintendent,* W. A. Yeager, Westbourne; *Inside Foreman,* R. T. Boone, Westbourne.

This is a Class C drift mine, located in Rich Mountain, 1,100 feet above sea level, at Westbourne. It connects with the L. & N. Railroad. The Log Mountain seam is worked; it has a thickness of 43 inches. The roof is slate, and the bottom is fire clay and sandstone. It is developed on the room and pillar system. Ventilation is supplied by a fan with a diameter of 10 feet, and is distributed by the split system. Haulage is conducted from butt entries to sidetrack, a distance of 2,000 feet, by gathering motors; from sidetrack to knuckle, a distance of 2,700 feet, by tram motor; from knuckle to railroad, a distance of 800 feet, by gravity incline.

CAMPBELL COUNTY.

White Oak Mine—*Owner,* Campbell Coal Mining Co., Westbourne; *Operator,* Campbell Coal Mining Co., Westbourne; *President,* J. J. Egan, Atlanta; *Superintendent,* W. A. Yeager, Westbourne; *Inside Foreman,* James Carmack, Westbourne.

This is a Class C drift mine. It is located 1½ miles from Westbourne, on the L. & N. Railroad. The Log Mountain seam is worked; it has an average thickness of 44 inches. The mine is developed on the double entry plan. The mine is ventilated by a Stine fan 7 feet in diameter, and the ventilation is distributed by the split current system. This mine is equipped with electric mining machines and motor haulage. At this time main entry has been driven only a short distance and motor haul from mouth of mine is 5,200 feet to knuckle where mine cars are lowered by incline 1,250 feet in length to railway cars.

CAMPBELL COUNTY.

Woodward No. 1 Mine—*Owner,* C. M. Woodward, Jellico; *Operator,* C. M. Woodward, Jellico; *President,* C. M. Woodward, Jellico; *Superintendent,* C. M. Woodward, Jellico; *Inside Foreman,* C. M. Woodward, Jellico.

This is a Class C drift mine. It is located in Jellico Mountain, 1,200 feet above sea level, ½ mile from Jellico; it connects with the L. & N. and the Southern Railroads. The Blue Gem seam is worked; it has an average thickness of 24 inches. The roof is slate, and the bottom is fire clay. It is developed on the room and pillar system. It is ventilated by a furnace, with a grate area of 35 feet, and the ventilation is distributed by the split system. Haulage is conducted from headings to tipple, by mule; the distance is 1,000 feet.

CAMPBELL COUNTY.

Wooldridge Mine—*Owner,* Wooldridge Jellico Coal Co., Wooldridge; *Operator,* Wooldridge Jellico Coal Co., Wooldridge; *President,* P. Wooldridge, Pewee Valley, Ky.; *Superintendent,* Wm. Dinkelaker, Wooldridge; *Inside Foreman,* Thos. H. Griffith, Wooldridge.

This is a Class C drift mine. It is located in Jellico Mountain, 1,200 feet above sea level, 1⅞ miles from Newcomb; it connects with the Southern Railroad. The Jellico seam is worked; it has an average thickness of 42 inches. The roof is slate, and the bottom is fire clay. It is developed on the single entry and single room system. Ventilation is produced by a furnace, with a grate area of 64 feet; it is distributed by the direct current system. Haulage is conducted from rooms to knuckle, a distance of 1,000 feet, by mules; and from knuckle to railroad, a distance of 1,335 feet, by incline.

CAMPBELL COUNTY.

Wynn Mine—*Owner,* Wynn Coal Co., Gatliff; *Operator,* Wynn Coal Co., Gatliff; *President,* A. J. Jones, Gatliff; *Superintendent,* Harry Wynn, Gatliff; *Inside Foreman,* W. H. Keyes, Gatliff.

This is a Class C drift mine. It is located in Brush Mountain, 1,200 feet above sea level, 8 miles from LaFollette; it connects with L. & N. Railroad. The Rich Mountain seam is worked; it has an average thickness of 34 inches. The roof is slate, and the bottom is fire clay. It is developed on the room and pillar system.

Ventilation is produced by a fan 5 feet in diameter, and is distributed by the continuous current system. Haulage is conducted from mouth of rooms to top of incline, a distance of 1,600 feet, by electric motor; from top of incline to railroad, a distance of 400 feet, by monitors.

CAMPBELL COUNTY.

Zechini Mine—*Owner,* Peter and Thos. Zechini, Newcomb; *Operator,* Peter Zechini, Newcomb; *President,* Peter Zechini, Newcomb; *Superintendent,* Peter Zechini, Newcomb; *Inside Foreman,* Joe Graef, Newcomb.

This is a Class C drift mine. It is located in Middle Ridge Mountain, 2½ miles from Newcomb; its elevation is 1,275 feet above sea level; it connects with the Southern Railroad. The Jellico seam is worked; it has an average thickness of 34 inches. The roof is slate and sandstone, and the bottom consists of hard fire clay; it is developed on the single entry and double room system. Ventilation is produced by furnace, with a grate area of 40 feet, and is distributed by the split system. Haulage is conducted from rooms to outside track, a distance of 500 feet, by mules; from outside track to knuckle, a distance of 5,000 feet, by engine; from knuckle to tipple, a distance of 1,000 feet, by gravity.

CLAIBORNE COUNTY.

Bryson Mountain No. 1 Mine—*Owner,* American Association, Middlesboro, Ky.; *Operator,* Bryson Mountain Coal & Coke Co., Hartranft; *President,* Tim Cockrill, Mahoney City, Pa.; *Superintendent,* A. L. Adam, Hartranft; *Inside Foreman,* Julius Brown, Hartranft.

This is a Class C drift mine. It is located 1,755 feet above sea level, in Bryson Mountain; it is 1 mile from Hartranft; it connects with the L. & N. and the Southern Railroads. The Mingo seam is worked; it has an average thickness of 60 inches. The roof is slate, and the bottom is slate and fire clay. It is developed on the double entry system. It is ventilated by a fan 8 feet in diameter. The ventilation is distributed by the continuous current system. Haulage is conducted from the rooms to sidetrack, a distance of 1,000 feet, by mules; from sidetrack to tipple, a distance of 6,000 feet, by motors.

CLAIBORNE COUNTY.

Bryson Mountain No. 2 Mine—*Owners,* Bryson Mountain Coal & Coke Co., Hartranft; *Operator,* Bryson Mountain Coal & Coke Co., Hartranft; *President,* T. Cockrill, Hartranft; *Superintendent,* A. L. Adam, Hartranft; *Inside Foreman,* J. W. Brown, Hartranft.

This is a Class C mine. It is located in Bryson Mountain, 1 mile from Hartranft; it connects with the L. & N. and the Southern Railroads. The elevation is 2,255 feet. The Sterling seam is worked; it has an average thickness of 66 inches. The roof is slate, and the bottom is shale. It is developed on the double entry plan. The mine is ventilated by a fan 9 feet in diameter, and the ventilation is distributed by the continuous current system. Haulage is conducted from faces to tipple, a distance of 1,400 feet, by mules; from tipple to railroad, a distance of 700 feet, by rope. Very little work was done at this mine during the year.

CLAIBORNE COUNTY.

Buffalo Mine—*Owner,* Campbell Coal Mining Co., Eagan; *Operator,* Campbell Coal Mining Co., Eagan; *President,* R. O. Campbell, Atlanta, Ga.; *Superintendent,* John H. Reynolds, Eagan; *Inside Foreman,* Riley Parrot, Eagan.

This is a Class C drift mine. It is located in Cumberland Mountain, 12 miles from Jellico. It connects with the L. & N. and the Southern Railroads. The elevation is 1,425 feet above sea level. The Remy seam is worked; it has an average thickness of 36 inches. The roof is slate, and the bottom is sandstone. It is developed on the single entry system. It is ventilated by two fans, each 4 feet in diameter, and by two furnaces, with a grate area of 50 feet each. The ventilation is distributed by the continuous current system. Haulage is conducted from fall to drum house, a distance of 5,100 feet, by motor; from drum house to tipple, a distance of 667 feet, by gravity.

CLAIBORNE COUNTY.

Fork Ridge Nos. 1 & 2 Mine—*Owner,* American Association, Middlesboro, Ky.; *Operator,* Fork Ridge Coal & Coke Co., Fork Ridge; *President,* C. S. McManus, Knoxville; *Superintendent,* A. H. Rennebaum, Middlesboro, Ky.; *Inside Foreman,* C. H. Farmer and John Lewis, Fork Ridge.

This is a Class C drift mine. It is located in Mingo Mountain, ¾ mile from Fork Ridge; it connects with the L. & N. and the Southern Railroads. The elevation is 1,700 feet above sea level. The Mingo seam is worked; it has an average thickness of 54 inches. The roof is slate, and the bottom is clay. It is developed on the room and pillar system. This mine is ventilated by a fan 14 feet in diameter, and the ventilation is distributed by the split system. Haulage is conducted from rooms to general sidetrack, a distance of 800 feet, by mules; from general sidetrack to siding, a distance of 2,000 feet, by motors; from train siding to tipple, a distance of 6,500 feet, by motors.

CLAIBORNE COUNTY.

Fork Ridge No. 3 Mine—*Owner,* American Association, Middlesboro, Ky.; *Operator,* Fork Ridge Coal & Coke Co., Fork Ridge; *President,* C. S. McManus, Knoxville; *Superintendent,* A. H. Rennebaum, Middlesboro, Ky.; *Inside Foreman,* E. Lewis, Fork Ridge.

This is a Class C drift mine. It is located in Mingo Mountain, 1½ miles from Fork Ridge. It connects with the L. & N. and the Southern Railroads. It has an elevation of 2,500 feet above sea level. The Lower Hignite seam is worked; it has an average thickness of 44 inches. The roof is slate and sandstone, and the bottom is slate. It is developed on the double entry system. It is ventilated by a fan 10 feet in diameter, and the ventilation is distributed by the split system. Haulage is conducted from rooms to tipple, a distance of 1,500 feet, by motor.

CLAIBORNE COUNTY.

Fork Ridge No. 4 Mine—*Owner,* American Association, Middlesboro, Ky.; *Operator,* Fork Ridge Coal & Coke Co., Fork Ridge; *President,* C. S. McManus, Knoxville; *Superintendent,* A. H. Rennebaum, Middlesboro, Ky.; *Inside Foreman,* E. Lewis, Fork Ridge.

This is a Class C drift mine. It is located in Mingo Mountain, 1½ miles from Fork Ridge; it connects with the L. & N. and the Southern Railroads. The elevation is 2,300 feet above sea level. The Sterling seam is worked; it has an average thickness of 52 inches. Both the roof and the bottom are slate. It is developed on the double entry system. Ventilation is produced by furnace. This mine is just being opened up and is driving only two pairs of entries.

CLAIBORNE COUNTY.

King Mountain Mine—*Owner,* King Mountain Coal Co., Chattanooga; *Operator,* King Mountain Coal Co., Chattanooga; *President,* G. W. Easton, Middlesboro; *Superintendent,* N. L. Reynolds, Clairfield; *Inside Foreman,* Harry Fallon, Clairfield.

This is a Class C drift mine. It is located in Log Mountain, 113 miles from Jellico; it connects with the Southern and the L. & N. Railroads. The elevation is 1,256 feet above sea level. The Jellico seam is worked; it has an average thickness of 41 inches. The roof is slate, and the bottom is fire clay. It is developed on the single entry system. It is ventilated by a furnace, with a grate area of 40 feet; the ventilation is distributed by the continuous current system. Haulage is conducted from tipple to knuckle, a distance of 650 feet, by gravity incline; from knuckle to main portal, a distance of 2,000 feet, by tail rope; from portal to sidetrack, a distance of 950 feet, by tail rope.

CLAIBORNE COUNTY.

Mingo No. 5 Mine—*Owner,* American Association, Middlesboro; *Operator,* Mingo Coal & Coke Co., Hartranft; *President,* R. L. Ralston, Hartranft; *Superintendent,* J. T Ralston, Hartranft; *Inside Foreman,* John Minton, Hartranft.

This is a Class C drift mine. It is located in Mingo Mountain, ½ mile from Hartranft; it connects with the L. & N. and the Southern Railroads. The elevation is 2,250 feet above sea level. The Mingo No. 5 seam is worked; it has an average thick-

ness of 52 inches. The roof is slate, and the bottom is fire clay. It is developed on the single entry, room and pillar system. Ventilation is produced by a fan 7 feet in diameter; it is distributed by the continuous current system. Haulage is conducted from rooms to sidetrack, a distance of 900 feet, by mules; from inside sidetrack to drum house, a distance of 3,000 feet, by gasoline motor; from drum house to loading tipple, a distance of 1,650 feet, by gravity. There were formally several other openings reported as separate mines. They are now either abandoned or included and reported on in connection with mine No. 5.

CLAIBORNE COUNTY.

Nicholson No. 2 Mine—*Owner,* Nicholson Coal Mining Co., Fork Ridge; *Operator,* Nicholson Coal Mining Co., Fork Ridge; *President,* J. C. Cardwell, Louisville, Ky.; *Superintendent,* E. R. Short, Nicholson; *Inside Foreman,* A. H. Davidson, Nicholson.

This is a Class C drift mine. It is located in Mingo Mountain, ¼ mile from Nicholson; it connects with L. & N. and Southern Railroads. The Sandstone Parting seam is worked; it has an average thickness of 60 inches. The roof is stone, and the bottom is fire clay. It is developed on the double entry system. It is ventilated by a fan 7 feet in diameter; the ventilation is distributed by the continuous current system. Haulage is conducted from room to sidetrack, a distance of 1,000 feet, by mules; from sidetrack to entrance, a distance of 900 feet, by mules; from entrance to knuckle, a distance of 900 feet, by mules; from knuckle to railroad, a distance of 2,000 feet, by gravity.

CLAIBORNE COUNTY.

Nicholson No. 3 Mine—*Owner,* Nicholson Coal Mining Co., Fork Ridge; *Operator,* Nicholson Coal Mining Co., Fork Ridge; *President,* J. C. Cardwell, Louisville, Ky.; *Superintendent,* E. R. Short, Middlesboro, Ky.; *Inside Foreman,* A. H. Davidson, Fork Ridge.

This is a Class C drift mine. It is located in Mingo Mountain, ¼ mile from Nicholson; it connects with the L. & N. and the Southern Railroads. The elevation is 2,030 feet above sea level. The Nicholson seam is work; it has an average thickness of 60 inches. The roof is slate, and the bottom is fire clay. It is developed on the double entry system. Ventilation is produced by a fan, with a diameter of 7 feet, and is distributed by the continuous current system. Haulage is conducted from room to entrance, a distance of 600 feet, by mules; from entrance to knuckle, a distance of 3,500 feet, by locomotive; from knuckle to railroad, a distance of 3,400 feet, by gravity.

CLAIBORNE COUNTY.

Pruden Mine—*Owner,* American Association, Middlesboro, Ky.; *Operator,* Pruden Coal & Coke Co., Knoxville; *President,* Thos. Pruden, Knoxville; *Superintendent,* Geo. M. Wallen, Pruden; *Inside Foreman,* Rufe Speaks, Pruden.

This is a Class C drift mine. It is located in Bryson Mountain, 1,700 feet above sea level, 20 miles from Jellico. It connects with the L. & N. and the Southern Railroads. The Mingo seam is worked; it has an average thickness of 60 inches. Both the roof and the bottom are slate. It is developed on the room and pillar system. Ventilation is produced by a fan 12 feet in diameter, and is distributed by the split system. Haulage is conducted from rooms to sidetracks, a distance of 800 feet, by mules; from sidetrack to tipple, a distance of 6,000 feet, by electric haulage; from tipple to chute, a distance of 1,500 feet, by monitors.

CLAIBORNE COUNTY.

Reliance Nos. 1, 2 & 3 Mine—*Owner,* American Association, Middlesboro, Ky.; *Operator,* Reliance Coal & Coke Co., Hartranft; *President,* Geo. W. Whiteman, Philadelphia, Pa.; *Superintendent,* J. B. Robinson, Hartranft; *Inside Foreman,* Geo. G. Bell, Hartranft.

This is a Class C drift mine. It is located in the Mullin's Spur of Bryson Mountain, at Hartranft; it connects with the L. & N. and the Southern Railroads. The elevation is 1,600 feet above sea level. The Mingo seam is worked; it has an average thickness of 60 inches. Both the roof and the bottom are slate. It is de-

veloped on the double entry system. Ventilation is produced by a fan 8 feet in diameter, and by a furnace, with 42 feet grate area, and is distributed by the continuous current system. Haulage is conducted from room to sidetrack, a distance of 500 feet, by mules; from sidetrack to tipple, a distance of 1,600 feet, by wire rope; from room to sidetrack, a distance of 700 feet, by mule; from sidetrack to tipple, a distance of 2,700 feet, by wire rope; from tipple to railroad, a distance of 75 feet, by chute. In the inspector's reports Reliance Nos. 1 and 2 and Reliance No. 3 are shown and reported on as two separate mines, although they are described together in the above.

CLAIBORNE COUNTY.

Standard Mine—*Owner,* Standard Jellico Coal Co., Knoxville; *Operator,* Standard Jellico Coal Co., Knoxville; *President,* Chas. F. Eager, Knoxville; *Superintendent,* L. R. Eager, Middlesboro, Ky.; *Inside Foreman,* S. C. Craig, Clairfield.

This is a Class C drift mine. It is located in a spur of Log Mountain, ¾ mile from Clairfield, 1,240 feet above sea level. It connects with the L. & N. and the Southern Railroads. The Jellico seam is worked; it has an average thickness of 38 inches. The roof is slate, and the bottom is fire clay. It is developed on the single room system. Ventilation is produced by a fan 6 feet in diameter, and is distributed by the continuous current system. Haulage is conducted from head of No. 5 A to knuckle, a distance of 1,450 feet, by mules; from head of No. 1 B to knuckle, a distance of 2,000 feet, by mules; from head of No. 3 B to knuckle, a distance of 1,800 feet, by mules; from head of No. 2 C, a distance of 1,550 feet, by mules; from knuckle to sidetrack, a distance of 800 feet, by gravity.

CLAIBORNE COUNTY.

Sterling Nos. 1 & 2 Mine—*Owner,* American Association, Middlesboro, Ky.; *Operator,* Sterling Coal & Coke Co., Manring; *President,* C. A. McManus, Manring; *Superintendent,* C. B. Finley, Jr., Manring; *Inside Foreman,* W. T. Robinson, Manring.

This is a Class C drift mine. It is located in Log Mountain, at Manring; it connects with the Southern Railroad. The elevation is 2,300 above sea level. The Sterling seam is worked; its average thickness is 60 inches. The roof is slate, and the bottom is fire clay. It is developed on the room and panel system. Ventilation is produced by two fans, and is distributed by the double entry split system. Haulage is conducted from face to small sidings, a distance of 500 feet, by mules; from small sidings to main siding, a distance of 3,000 feet, by motors; from main siding to tipple, a distance of 4,000 feet, by motors.

CLAIBORNE COUNTY.

Yellow Creek No. 2 Mine—*Owner,* American Association, Middlesboro, Ky.; *Operator,* Yellow Creek Coal Co., Middlesboro, Ky.; *President,* John G. Fitzpatrick, Middlesboro, Ky.; *Superintendent,* Geo. Veal, Bosworth, Ky.; *Inside Foreman,* Dan Wallbrecht, Bosworth, Ky.

This is a Class C drift mine. It is located in Mingo Mountain, 5 miles from Middlesboro, and connects with the L. & N. and the Southern Railroads. The elevation is 2,275 feet above sea level. The Jack Rock seam is worked; it has an average thickness of 48 inches. The roof is slate, and the bottom is fire clay. It is developed on the single entry system. Ventilation is produced by a fan 7 feet in diameter, and is distributed by the continuous current system. Haulage is conducted from rooms to sidetrack, a distance of 1,500 feet, by mules; from sidetrack to tipple, a distance of 1,000 feet, by motors; from tipple to railroad, a distance of 1,700 feet, by incline.

CLAIBORNE COUNTY.

Yellow Creek No. 3 Mine—*Owner,* American Association, Middlesboro, Ky.; *Operator,* Yellow Creek Coal Co., Middlesboro, Ky.; *President,* John G. Fitzpatrick, Middlesboro, Ky.; *Superintendent,* Geo. Veal, Bosworth, Ky.; *Inside Foreman,* Dan Wallbrecht, Bosworth, Ky.

This is a Class C drift mine. It is located in Mingo Mountain, 5 miles from Middlesboro; it connects with the L. & N. and the Southern Railroads. The elevation is 2,425 feet above sea level. The Poplar Lick seam is worked; it has an average

thickness of 68 inches. The roof is slate, and the bottom is fire clay. It is developed on the single entry system. It is ventilated by a fan 7 feet in diameter, and the ventilation is distributed by the split system. Haulage is conducted from heading to siding, a distance of 500 feet, by mules; from siding to tipple, a distance of 1,500 feet, by motors; from tipple to railroad, a distance of 400 feet, by incline.

CUMBERLAND COUNTY.

Clear Creek No. 1-5 Mine—*Owner and Operator,* Clear Creek Coal & Lumber Co., Isoline; *President,* J. E. Cummins, Columbus, Ohio; *Superintendent,* J. L. Barr, Isoline; *Inside Foreman,* W. H. Reeves, Isoline.

This is a Class C slope mine, located at Isoline, on a spur line, connecting with the Tennessee Central Railroad at Campbell's Junction, a distance of 8 miles. The Isoline seam, located 1,900 feet above sea level, is worked. This seam has an average thickness of 3 feet, and is developed on the single and double entry system. Generally speaking, it is a damp mine, and the coal is hard. The roof is slate and sandshale, and the bottom is fire clay and hard rock. Ventilation is produced by a 15-foot Crawford and McCrimmon centrifugal fan, propelled by steam, and is by continuous current; it is conducted through the development by doors and wooden stoppings. The fan housing is so constructed that this fan can reverse the ventilating current if required. Haulage is from rooms to sidetrack, at foot of slope, by mules; and from this sidetrack to tipple, a distance of 500 feet, by rope.

CUMBERLAND COUNTY.

Fall Creek Mine—*Owner,* Fall Creek Collieries, Ozone; *Operator,* E. G. Tollett, Receiver, Crossville.

This is a Class C drift mine, located 2,000 feet above sea level, in the Cumberland Plateau. It is 2½ miles from Ozone, and connects with the Tennessee Central Railroad. The Sewanee seam, which at this point is very irregular in thickness, is worked. The roof is slate, and the bottom fire clay. It is developed on the double entry, room and pillar system, and has a furnace, although natural ventilation is relied on largely at present. This mine has been idle for some time, very little work having been done this year. No development work is being done, the mining consists of recovering pillars. Haulage is by mules.

FENTRESS COUNTY.

Wilder No. 1-2 Mine—*Owner and Operator,* Fentress Coal & Coke Co., Wilder; *President,* G. H. Taylor, Philadelphia; *Superintendent,* Joseph Cain, Wilder; *Inside Foreman,* Titus Barwick, Wilder.

This is a Class C drift mine, located at Wilder, and connects by branch line with Tennessee Central Railroad at Monterey, a distance of 20 miles. The No. 2 Bon Air seam, located 1,620 feet above sea level, and having an average thickness of 4½ feet, is worked. The roof is slate, and the bottom sandstone. Some sections of this mine are dry, while other portions are wet. The coal is very hard; some of it is undercut with electric mine machines, and some shot off the solid. It is developed on the double entry and double room system. Ventilation is produced by two fans, with a diameter of 9 and 10 feet, respectively, and is conducted through the development by wooden stoppings, and distributed by the split system. Coal is hauled from rooms and working places to tipple, by electric motors.

GRUNDY COUNTY.

Clouse Hill Mine—*Owner and Operator,* Sewanee Fuel & Iron Co., Coalmont; *President,* J. E. Patton, Chattanooga; *Superintendent,* H. S. Walden, Coalmont; *Inside Foreman,* J. S. Brown, Tracy City.

This is a Class D drift mine, located about 3 miles southwest of Coalmont, and connects with the N., C. & St. L. R. R. branch line. The Sewanee seam, located 1,950 feet above sea level, and having an average thickness of 3 feet, is worked The roof and bottom are both slate. It is developed on the single entry system; it is ventilated by furnace and natural conditions, and is distributed by continuous current. Haulage is conducted by mules.

GRUNDY COUNTY.

Coalmont A, B, L & O Mines—*Owner and Operator,* Sewanee Fuel & Iron Co., Coalmont; *President,* J. E. Patton, Chattanooga; *Superintendent,* H. S. Walden, Coalmont; *Inside Foreman,* J. M. Sehorn, Coalmont.

These are Class C drift mines, located at Coalmont, the terminus of the N., C. & St. L. branch line connecting with the N., C. & St. L. R. R. at Cowan, a distance of 27 miles. This mining plant consists of three openings, close together, L and O being connected. The Sewanee seam, located 1,904, 1,923 and 1,907 feet, respectively, above sea level; having an average thickness of 34 inches, is worked. Both roof and bottom are slate, and it is developed on the single entry system. Generally speaking, these are damp mines, and the coal being rather of a soft nature, is partly cut with pick and then loosened with black power. Ventilation is produced by furnaces, and conducted by means of doors and wooden stoppings to working places. Haulage is conducted from rooms to tipples by mules.

GRUNDY COUNTY.

East Fork Mine—*Owner and Operator,* Tennessee Consolidated Coal Co., Tracy City; *President,* E. L. Hampton, Tracy City; *Superintendent,* R. B. Roberts, Tracy City; *Inside Foreman,* W. C. Parsons, Tracy City.

This mine is located on branch line of N., C. & St. L. Railroad, 1 mile northeast from Tracy City. It is a Class D drift mine, in the Sewanee seam, located 1,900 feet above sea level, and has an average thickness of 42 inches. Ventilation is produced by natural causes, and is usually good throughout the development, and ample for the work being done. Drawing entry stumps and pillars is the only work being done—employing an average of six or seven miners. The roof is slate, and is generally good, the bottom is fire clay. The coal is gathered from working places and hauled to tipple by mules.

GRUNDY COUNTY.

Ferguson Mine—*Owner,* M. J. Ferguson, Huntington, W. Va.; *President,* J. B. Ferguson, Coalmont; *Operator, Superintendent and Inside Foreman,* J. A. Harrison, Coalmont.

This is a Class D drift mine, located ½ mile north of Coalmont, and connected with branch line of N., C. & St. L. Railway at Coalmont. The Sewanee seam, located 1,900 feet above sea level, and having an average thickness of 24 inches, is worked. It is developed on the single entry, room and pillar system, and is ventilated by furnace on a continuous current. The roof is slate, and the bottom hard rock. It is a very wet mine, and the water is disposed of by hauling it to the outside in water car. The coal is shot from the solid and the explosive used is black powder. Coal is hauled from rooms and entry headings to tipple, a distance of about 2,000 feet, by mules.

GRUNDY COUNTY.

Henley Mine—*Owner and Operator,* Tennessee Consolidated Coal Co., Tracy City; *President,* E. L. Hampton, Tracy City; *Superintendent,* R. B. Roberts, Tracy City; *Inside Foreman,* Willis Almon, Tracy City.

This is a Class D drift mine, located 1½ miles southeast of Tracy City on branch line, connecting with N., C. & St. L. branch line railroad, at Tracy City. The Sewanee seam, located 1,962 feet above sea level, and having an average thickness of 42 inches, is worked. The roof and bottom are both slate. It is developed on the single entry, room and pillar system, and is ventilated by a small furnace on a continuous current. Haulage is conducted from rooms to tipple by mules.

GRUNDY COUNTY.

Lone Rock Mine—*Owner and Operator,* Tennessee Consolidated Coal Co., Tracy City; *President,* E. L. Hampton, Tracy City; *Superintendent,* R. B. Roberts, Tracy City; *Inside Foreman,* W. C. Parsons, Tracy City. This mine is reported in connection with East Fork Mine.

This is a Class D drift mine, located about 1 mile northeast from Tracy City, on branch line of N., C. & St. L. Railroad. The Sewanee seam is operated, which has an average thickness of 42 inches, and is located 1,960 feet above sea level. Developments are on the single entry system. All work being performed in the mine now is confined to drawing pillar and entry stump coal. Ventilation is produced by furnace and natural causes, and is ample for the men and work being done. The roof is slate, and the bottom is fire clay. This is generally speaking a wet mine.

GRUNDY COUNTY.

Ramsey Mine—*Owner and Operator,* Tennessee Consolidated Coal Co., Tracy City; *President,* E. L. Hampton, Tracy City; *Superintendent,* R. B. Roberts, Tracy City; *Inside Foreman,* J. D. Wiley, Tracy City.

This is a Class C drift mine, consisting of a number of little openings close together, and all under the same management; it is located 2½ miles southwest of Tracy City, on a railroad branch line, connecting with the N., C. & St. L. branch line railroad. The Sewanee seam, with an average altitude of 1,903 feet above sea level, is worked. This seam has an average thickness of 42 inches, and is generally damp. Ventilation is furnished by small furnaces and natural conditions. The roof is slate, and the bottom is generally slate or fire clay. All development is on the single entry, room and pillar system. All coal is hauled from rooms and other working places to tipple by mules.

GRUNDY COUNTY.

Reid Hill Mine—*Owner and Operator,* Tennessee Consolidated Coal Co., Tracy City; *President,* E. L. Hampton, Tracy City; *Superintendent,* R. B. Roberts, Tracy City; *Inside Foreman,* Willis Almon, Tracy City.

This is a Class C drift mine, located about 1¼ miles southeast of Tracy City, on branch railroad line, connecting with N., C. & St. L. branch line railroad at Tracy City. The Sewanee seam, with an altitude of 1,910 feet above sea level, is worked. This seam has an average thickness of 42 inches, and is generally damp. No new development is being done in this mine—all rob work. The roof is slate, and the bottom fire clay. Ventilation is furnished by furnace and natural conditions, and is generally not very well distributed throughout the development. All coal is hauled from working places in the mine to the tipple, by mules.

GRUNDY COUNTY.

Werner Mine—*Owner and Operator,* Tennessee Consolidated Coal Co., Tracy City; *President,* E. L. Hampton, Tracy City; *Superintendent,* R. B. Roberts, Tracy City; *Inside Foreman,* W. C. Parsons, Tracy City. This mine is reported in combination with Ramsey Mine.

This is a Class C drift mine; it is located about 1 mile northeast of Tracy City, and is connected with branch line of the N., C. & St. L. Railroad. The Sewanee seam, having an average thickness of 3 feet, and located 1,965 feet above sea level, is worked. The roof is slate, and the bottom fire clay. Developments are on the single entry system—all work now being rob work. Ventilation is produced by natural conditions and is generally good throughout the mine. Coal is gathered from working places and hauled to tipple by mules.

HAMILTON COUNTY.

Alexander Mine—*Owner,* Charles E. Allen, Daisy; *Operator and Superintendent,* T. A. Alexander, Daisy; *Inside Foreman,* A. N. Smith, Daisy.

This mine is located on Walden's Ridge, 3 miles west of Melville Station, on C., N. O. & T. P. Railroad. It is a Class D drift mine, operated in the No. 10 seam, which has an average thickness of 30 inches, and is located 1,965 feet above sea level. The roof is slate, and the bottom fire clay. It is developed on the single entry, room and pillar system, and is ventilated by small furnace, distributing the current on the continuous system. Coal is hauled from working places in the mine to the tipple, by mules; and from tipple to Melville, in wagons. This coal is used for heating pottery kilns.

HAMILTON COUNTY.

Big Soddy No. 7 Mine—*Owner and Operator,* Durham Coal & Iron Co., Chattanooga; *President,* C. B. Eddy, Chattanooga; *Superintendent,* J. H. Jones, Soddy; *Inside Foreman,* J. B. Mansfield, Soddy.

This mine is located in Walden's Ridge, 1¼ miles northward of Rathburn Station on the Queen & Crescent Railroad. It is a Class C drift mine, operating in the No. 7 seam, which has an average thickness of 3 feet, and is located 1,200 feet above sea level. The roof is a hard blue slate, and the bottom is sandstone. The coal is of a soft nature, and is overlaid with a strata of rash or draw slate, varying in thickness from 3 to 6 inches. The coal is broken down by solid shooting with black powder. This mine is generally moist, but some sections are inclined to be a little dry, and sprinkling is required in these. An average of 30 men and 8 mules are employed. Ventilation is produced by a furnace, and conducted through the development by wooden stoppings, and distributed as a continuous current. It is developed on the double entry and single room system. Coal is hauled from rooms to head of incline, a distance of about 2,500 feet, by mules; and then lowered down incline, in mine cars, a distance of 700 feet, by gravity drum to tipple.

HAMILTON COUNTY.

Montlake Mine—*Owner and Operator,* Montlake Coal Co., Chattanooga; *President,* Carl White, Chattanooga; *Superintendent,* W. E. Brinkerhoff, Montlake; *Inside Foreman,* M. F. Hatfield, Montlake. During the latter part of the year, F. B. Keiser and H. S. Geismer became Operators, with H. S. Geismer, Superintendent, Montlake; and Joe White, Inside Foreman, Montlake.

This mine is located high up in Walden's Ridge, about 1¾ miles westward from Montlake Station, on the Queen & Crescent Railroad. It is a Class C drift mine, operating in the No. 10 seam, having an average thickness of 3 feet, and located 1,650 feet above sea level. It is developed on the single entry, single room and pillar system. The roof is slate, and the bottom is slate. This is a damp or moist mine, and solid shooting is generally practiced. Ventilation is produced by a 7-foot Stine fan, and is conducted through the working faces by wooden stoppings, and is by continuous current. Coal is hauled from rooms and other working places to sidetrack, by mules; and from sidetrack to tipple, a distance of 3,328 feet, by main and tail rope; then lowered from tipple to chute, down an incline, in ten-ton monitor cars, a distance of 2,020 feet, by drum; and then from chute, at foot of incline, by locomotive, on spur line, to Montlake Station.

HAMILTON COUNTY.

Sale Creek Mine—This mine is owned and operated by the Durham Coal & Iron Co., with C. B. Eddy, President, Chattanooga; J. H. Jones, Superintendent, Soddy; and R. L. Woods, Inside Foreman, Sale Creek.

It is located in Walden's Ridge, 1 mile west of Sale Creek. It is opened up on the double entry system; the ventilating current is produced by a 10-foot Crawford and McCrimmon exhaust fan, propelled by steam, and is distributed on the split system, and conducted throughout the development by means of wooden stoppings. The roof is slate, and the bottom hard rock. The Nelson or No. 2 seam, located 875 feet above sea level, and having an average thickness of 42 inches, is operated. This is a Class B slope mine, in which an average of 130 men are employed, producing a daily output of 475 tons. The roof is slate, and the bottom is sandstone. The greater part of the mine is damp, and some sections are wet. The coal is rather soft and has a strata of slaty rash through it, varying in thickness from 1 to 4 inches. The coal is obtained by solid shooting with black powder. Haulage is conducted from working faces to sidetrack, by mules; and from sidetrack to tipple, a distance of 3,600 feet, by rope; and from tipple, by locomotive, on spur line, to station on the C. N. O. & T. P. R. R.

HAMILTON COUNTY.

Soddy No. 1-2 Mine—*Owner and Operator,* Durham Coal & Iron Co., Chattanooga; *President,* C. B. Eddy, Chattanooga; *Superintendent,* J. H. Jones, Soddy; *Inside Foreman,* John Olinger, Soddy.

This is a Class C drift mine, located in Walden's Ridge, 1¼ miles west of

Rathburn Station, on the Queen & Crescent Railway. The No. 7 seam, having an average thickness of 28 inches, is worked. This is generally a damp mine. The coal is hard, and is obtained by solid shooting with black powder. In some sections, the roof is sandstone, and in others, it is slate. The bottom is rash and sandstone. It is developed on the double entry and double room system. Ventilation is produced by three 4-foot high speed Robison force fans, with electrical connection, producing an inlet current of 80,000 cubic feet of air per minute, which is distributed on the continuous current system. Generally speaking this is a damp mine, and some sections are inclined to be rather wet. An average of 225 men and 25 mules, are employed, producing an average daily output of 650 tons. Haulage is conducted from rooms and working faces to district sidetracks by mules; and from siding in No. 1 district to main sidetrack, a distance of 4,600 feet, by main and tail rope; and from siding, in No. 2 district, to main sidetrack, a distance of 2,400 feet, by gasoline motor; and from main sidetrack to head of incline on outside, a distance of 4,700 feet, by electric motors, it is then lowered down an incline in the mine cars, to the chute and washer, a distance of 7,100 feet, by rope and drum, which are propelled by steam.

HAMILTON COUNTY.

Soddy No. 4 Mine—*Owner and Operator,* Durham Coal & Iron Co., Chattanooga; *President,* C. B. Eddy, Chattanooga; *Superintendent,* J. H. Jones, Soddy; *Inside Foreman,* Robert Joseph, Soddy.

This mine is located about 2 miles westward from Rathburn Station, on the C. N. O. & T. P. R. R. It is a Class C slope mine, operating in the No. 7 seam, having an average thickness of 30 inches. It is developed on the double entry and single room system, and is ventilated by furnace, and distributed as continuous current. The roof is slate, and the bottom, hard fire clay with a slaty rash. The formation of the seam is very irregular, and is of a soft nature; it is obtained by solid shooting with black powder. Generally speaking this is a moist mine. Haulage is conducted from working faces to sidetrack by mules; and then from sidetrack to top of slope at engine room, a distance of 700 feet, by steam rope hoist, then lowered down an incline in mine cars, a distance of 1,000 feet, by rope and engine; and then to head of second incline, a distance of 1½ miles, by dinky locomotive; and then lowered down this incline, a distance of 800 feet, by gravity drum, connecting with incline from Mine 1 & 2; and then down this incline, a distance of 3,500 feet to chute and washer.

MARION COUNTY.

Battle Creek Mine—*Owner and Operator,* Battle Creek Coal & Coke Co., Orme; *President,* Roby Robinson, Atlanta, Ga.; *General Manager,* F. P. Thompson, Orme; *Inside Foreman,* Wm. McIntyre, Sr., Orme.

This mine is located in Cumberland Mountain, 1 mile northeast from Orme. It is a Class C drift mine, developed in the Battle Creek seam, which has an average thickness of 7 feet and an altitude of 1,650 feet above sea level. This seam of coal is very irregular in formation ranging in thickness from a few inches to twenty feet. The top is sandstone and has in most sections a regular formation. The bottom is also sandstone, but is very irregular in formation, rolling up almost suddenly and cutting the coal out, and then rolling down again as quickly. Generally speaking it is a moist mine, but some sections are inclined to be a little dry and dusty. The method of breakfast or loosening the coal is by solid shooting with black powder. This mine consists of four openings, all the coal being delivered to the same tipple. It is developed on the double entry, and single room and pillar system. Ventilation is produced by a 7-foot Stine fan with steam connection, and is conducted through the mine by wooden stoppings, and distributed by the split system. Haulage is conducted in 1, 2 and 3 openings, from rooms to tipple, by mules—the greatest distance not exceeding 2,500 feet. Haulage in No. 4 opening is by main and tail rope, a distance of 4,000 feet to mine entrance; and then by gasoline motor to tipple, a distance of 3,700 feet; and from tipple to chute at foot of incline, a distance of 2,700 feet by gravity drum; and then by locomotive on branch line to Bridgeport, a distance of 8 miles.

MARION COUNTY.

New Etna Mine—*Owner and Operator,* New Etna Coal Co., Chattanooga; *President,* Simon Golibart, Chattanooga; *Superintendent,* G. M. Price, Chattanooga; *Inside Foreman,* Thomas Dagman, Whiteside.

This mine is located in Cumberland Mountain, 3½ miles northwest from Whiteside Station, and is composed of a number of small openings. Some of these openings are only robbing work, drawing entry pillars, and the ventilation is furnished by natural conditions. The openings that are making developments are ventilated by small furnaces, and the current is conducted through the workings by wooden stoppings, and is on continuous current system. This is a Class C drift mine, operating in the Kelly seam, which has an average thickness of 31 inches, and is located 1,480 feet above sea level. These mines are damp, and the coal is mined with picks, very little explosives being used. This coal is noted for its superior qualities for smithing purposes. The roof is slate and the bottom hard rock. It is developed on the single entry, single room and pillar system. An average of about 90 men and 12 mules are employed, producing an output of about 200 tons daily. Haulage is conducted from rooms to sidetrack on outside, by mules; and from sidetrack to head of incline, a distance of 23,760 feet, by dinky locomotive; and from head of incline to foot, a distance of 4,200 feet, by gravity drum; and then from foot of incline to chute, a distance of 3,800 feet, by dinky locomotive, connecting with the N., C. & St. L. Railroad at Etna. These mines, covered by the above description show as separate mines on the inspector's list.

MARION COUNTY.

Pryor Ridge No. 1 Mine—*Owner and Operator,* Tennessee Consolidated Coal Co., Tracy City; *President,* E. L. Hampton, Tracy City; *Superintendent,* R. B. Roberts, Tracy City; *Inside Foreman,* S. L. Lowry, Tracy City.

This mine is located at terminus of branch line of the N., C. & St. L. Railroad, about 6 miles northeast from Tracy City. It is a Class C drift mine, operating in the Sewanee seam, which has an average thickness of 44 inches, and an altitude of 1,841 feet above sea level. The roof is slate in some sections, and in others it is sandstone; the bottom is slate and hard fire clay. This is a damp mine, the coal is of a soft nature and is mined by cutting with pick, and blasting with black powder. It is developed on the single room and pillar system. Ventilation is produced by an 8-foot Stine exhaust fan with steam connections, and is conducted through the development by wooden stoppings and is distributed mostly as continuous current. An average of 117 men and 8 mules are employed on the inside. Coal is hauled from rooms and working faces to sidetracks, by mules; from sidetrack to tipple, a distance of 3,500 feet, with gasoline motors; and from tipple to Tracy City, a distance of 6 miles, by locomotives on branch line, connecting with N., C. & St. L. R. R.

MARION COUNTY.

Pryor Ridge No. 2 Mine—*Owner and Operator,* Tennessee Consolidated Coal Co., Tracy City; *President,* E. L. Hampton, Tracy City; *Superintendent,* R. B. Roberts, Tracy City; *Inside Foreman,* S. L. Lowry, Tracy City.

This mine is located on branch line of N., C. & St. L. Railroad, 5½ miles northeast from Tracy City. It is opened up in the Sewanee seam, located 1,850 feet above sea level, and which has an average thickness of 42 inches. It is a damp mine, the coal is inclined to be soft and of the method of mining is mostly by solid shooting with black powder. The roof is slate and sandstone, and the bottom slate and hard fire clay. It is opened up on the single entry, room and pillar system. Ventilation is produced by a furnace, with a grate area of 36 feet, and is distributed through the development as continuous current. Haulage is conducted from rooms and other working places to tipple, by mules; and from tipple to Tracy City, a distance of 5½ miles, by locomotives.

MARION COUNTY.

Whitwell No. 1 Mine—*Owner and Operator,* Tennessee Coal, Iron & Railway Co., Birmingham, Ala.; *President,* George W. Crawford, Birmingham, Ala.; *Superintendent,* Thomas G. Fear, Whitwell; *Inside Foreman,* John W. Smith, Whitwell.

This mine is located high up in Cumberland Mountain, on the west side of

Sequatchie Valley, 1 mile northwest of Whitwell, on the N., C. & St. L. Railroad. It is a Class C drift mine, operating in the Sewanee seam, having at this point an average thickness of 40 inches, and is located 1,764 feet above sea level. The roof is slate, and the bottom fire clay and slate. This is a damp or moist mine. The method of obtaining the coal is by half mining with pick, and then blasting with black powder. The roadways of this mine, in many places, are wet, but they are kept very clean. Ventilation is produced by a 6-foot Clifford fan, with electric connections, producing an intake current of 33,845 cubic feet of air per minute, which is well distributed in the rooms and headings. The ventilating current is conducted through the development by concrete overcasts and stone and concrete stoppings, and is distributed by the split system. This mine has five openings and each opening is an air inlet. An average of 150 men and 3 mules are employed. Haulage is conducted from rooms and other working faces to tipple, a distance of 8,420 feet by electric motors; and then lowered in monitor cars down an incline, a distance of 5,309 feet to chute by gravity drum.

MARION COUNTY.

Whitwell No. 5 Mine—*Owner and Operator,* Tennessee Coal, Iron & Railway Co., Birmingham, Ala.; *President,* George W. Crawford, Birmingham, Ala.; *Superintendent,* Thomas G. Fear, Whitwell; *Inside Foreman,* John W. Smith, Whitwell.

This is a Class C drift mine, located in Cumberland Mountain, on the west side of Sequatchie Valley, 2 miles northwest of Whitwell. The Sewanee seam, having an average thickness of 39 inches, and located 1,741 feet above sea level, is worked. It is developed on the double entry, room and pillar system. Method of obtaining or mining coal is by half mining with pick and then blasting with black powder. The roof is slate, and the bottom fire clay. Generally speaking the entire mine is damp and some sections are inclined to be wet. Ventilation is produced by a 6-foot Clifford fan, with electric connections, furnishing 44,740 cubic feet of air per minute, which is conducted through the mine by means of concrete overcasts, stone and concrete stoppings. This mine has four openings exclusive of the fan, and each opening is an air inlet, distributing the ventilating current well in the headings. The haulways are kept clean and in a sanitary condition. An average of 250 men and 17 mules are employed. Coal is hauled from rooms and working faces to sidetrack, by mules; from inside sidetrack to siding on outside, a distance of 3,960 feet, by electric motors; and from outside siding to tipple, a distance of 6,600 feet by electric motors; and then down incline in monitor cars to chute, by gravity drum, a distance of 5,309 feet, connecting by spur line with N., C. & St. L. Railroad, at Whitwell Station.

MORGAN COUNTY.

Baker No. 1-2 Mine—*Owner,* Baker Mining Co., Coalfield; *Operator,* Baker Mining Co., Coalfield; *President,* J. N. Baker, Rockwood; *Superintendent,* J. N. Baker, Rockwood; *Inside Foreman,* T. Hatfield, Coalfield.

This is a Class B drift mine. It is located in Brushy Mountain, 2 miles from Coalfield; it connects with the H. & N. E. Railroad. The elevation is 1,000 feet above sea level. The Coalfield seam is worked; it has an average thickness of 54 inches. The roof is slate, and the bottom is slate and fire clay. It is developed on the single entry, room and pillar system. It is ventilated by a furnace, with a grate area of 32 feet. The ventilation is distributed by the continuous current system. No. 1 haulage is conducted from rooms to tipple, a distance of 1,000 to 1,200 feet, by mules. No. 2 haulage is conducted from rooms to tipple, a distance of 700 to 1,200 feet. Nos. 1 and 2 are worked as one mine.

MORGAN COUNTY.

Big Brushy No. 1-2 Mine—*Owner,* Big Brushy Coal & Coke Co., Petros; *Operator,* Big Brushy Coal & Coke Co., G. W. Chandler, Rec., Harriman; *General Manager,* A. H. Woods, Petros; *Inside Foreman,* W. S. Scarbrough, Petros.

This mine is located at Petros, on the Harriman Northeastern Railroad, 19½ miles from Harriman. It is a Class C drift mine, operating in the Jellico seam, located 1,620 feet above sea level, and has an average thickness of 39 inches. Under good top the coal is undercut with electric machines of the chain type, and by

compressed air machines of the puncher type, and under bad top with picks. The roof is slate and sandstone, and in some sections has a draw slate, varying in thickness from 3 to 10 inches; the bottom is hard fire clay. Generally speaking, it is a damp mine, and no dust of a dangerous character is found in any part of the mine. Ventilation is produced by a 5-foot disk fan propelled by a 15-horse power motor. The current is conducted through the development by stone and wooden stoppings, and is distributed as continuous current. An average of 55 men are employed on the inside. The method of breaking down the coal is by blasting with black powder. Coal is hauled from rooms and other working places to tipple, a distance of 4,000 feet, by electric motors; and from tipple to chute at foot of incline, a distance of 1,180 feet, by gravity drum.

MORGAN COUNTY.

Big Mountain Mine—*Owner,* Big Mountain Coal Co., Oliver Springs; *Operator,* Big Mountain Coal Co., Oliver Springs; *President,* Charles Livingston, Knoxville; *Superintendent,* Charles Livingston, Knoxville; *Inside Foreman,* Squire Broyles, Knoxville.

This is a Class A mine. It is located in Big Mountain, 4 miles from Oliver Springs. The elevation is 2,000 feet above sea level. The mine connects with the Southern Railroad. The Poplar Creek seam is worked; it has an average thickness of 36 inches. The roof is slate, and the bottom is fire clay. It is developed on the single entry system. It is ventilated by a furnace, with a grate area of 50 feet, and the ventilation is distributed by continuous current system. Haulage is conducted from mine to tipple, a distance of 1,800 feet, by mules.

MORGAN COUNTY.

Bowling No. 2 Mine—*Owner,* Bryn Mawr Mining & Land Co., Knoxville; *Operator,* H. B. Bowling Coal Co., Coalfield; *President and Superintendent,* W. H. Seinknecht, Receiver for H. B. Bowling Coal Co., Coalfield; *Inside Foreman,* E. M. Taylor, Coalfield.

This is a Class A drift mine. It is located in Big Brushy Mountain, 12 miles from Harriman, 1,000 feet above sea level; it connects with H. & N. E. Railroad, by C. N. O. & T. P. Railroad. The Coal Creek seam is worked. It has an average thickness of 48 inches. The roof is slate, and the bottom is slate. It is developed on the double entry, room and pillar system. Ventilation is produced by a fan, 7 feet in diameter, and is distributed by the continuous current system. Haulage is conducted from rooms to tipple, a distance of 5,000 feet, by electricity.

MORGAN COUNTY.

Fairchild Mine—*Owner, Operator and Superintendent,* W. G. Fairchild, Sunbright.

This is a Class D drift mine. It is located in Cumberland Mountain, 1½ miles from Huffman; it connects with C. N. O. & T. P. Railroad. The elevation is 1,480 feet above sea level. The Glen Mary seam is worked; it has an average thickness of 18 inches. The roof is slate, and the bottom is clay. It is developed on the single entry system. It is ventilated by a furnace, with a grate area of 14 feet, and the ventilation is distributed by natural current. Haulage is conducted from rooms to outside, a distance of 50 feet, by miners; from outside to tipple, a distance of 60 feet, by miners.

MORGAN COUNTY.

Harriman Mine (Known also as Gracey Ridge)—*Owner and Operator,* Harriman Coal Co., Harriman; *President,* S. E. DeFrese, Chattanooga; *Superintendent and Inside Foreman,* G. W. Walker, Harriman.

This mine is located about 7 miles from Harriman, on the Harriman & Northeastern Railroad. It is a Class D drift mine, operating in the Hooper seam, and is located 1,100 feet above sea level, and has an average thickness of 25 inches. The roof is sandstone and sandstone shale, the bottom is hard fire clay. It is opened up on the single entry, single room and pillar system. Ventilation is produced by a furnace, with a grate area of 30 feet, and is distributed as a continuous current.

The coal is hard, and solid shooting is the method of breaking it down. Haulage is conducted from rooms to head of incline, a distance of 1,500 feet, by mules; from top of incline to foot, a distance of 760 feet, by gravity drum; from foot of incline to tipple, a distance of 1 mile, by mules; from tipple to Blizzard switch, on H. & N. E. Railroad, a distance of ½ mile, by locomotive.

MORGAN COUNTY.

Hooper Mine—*Owner,* Coal Creek Mining & Mfg. Co., Knoxville; *Operator,* Bottomlee & Fagan, Blue Gem; *Inside Foreman,* J. A. Fagan.

This is a Class D mine, located on the Harriman & Northeastern Railroad, about 8 miles from Harriman. It is developed in the Hooper seam, which has an average thickness of 27 inches. The roof is sandstone, and the bottom hard fire clay. It is opened on the single entry, room and pillar system. Ventilation is produced by a small furnace, and is distributed as a continuous current. This is a damp mine, and the coal is mined by solid shooting with black powder. Coal is hauled from rooms to tipple, on outside, by mules; and from tipple at mine to tipple at railroad, a distance of 1,000 feet, by gravity car.

MORGAN COUNTY.

Jackson Mine (R. H. Jackson)—*Owner,* John M. Davis, Wartburg; *Operator,* R. H. Jackson, Coalfield.

This mine is located about 1 mile west from Coalfield. It is a Class D drift mine. The seam, operated has an average thickness of 42 inches. The roof is hard blue slate, and the bottom is hard fire clay. This seam has two bands of slate, varying in thickness from 6 to 10 inches. The coal is mined with picks, no powder being used. Ventilation is by natural conditions and is generally well distributed throughout the development. Haulage is conducted from rooms to outside, by mules; and from mine to Coalfield, by wagons.

MORGAN COUNTY.

Jackson Mine—*Owner,* Jackson Bros. Coal Co., Oliver Springs; *Operator,* Jackson Bros. Coal Co., Oliver Springs; *President,* T. J. Jackson, Oliver Springs; *Superintendent,* Alex Jackson, Oliver Springs; *Inside Foreman,* T. J. Jackson, Oliver Springs.

This is a Class C drift mine. It is located in Cumberland Mountain, 2 miles from Oliver Springs; the elevation is 1,100 feet above sea level. This mine connects with the Southern Railroad. The Poplar Creek seam is worked. It has an average thickness of 36 inches. The roof is slate, and the bottom is fire clay. It is developed on the single entry system. Ventilation is produced by a furnace, with a grate area of 6 feet, and is distributed by the continuous current system. Haulage is conducted from faces to tipple, a distance of 1,000 feet, by mules.

MORGAN COUNTY.

Little Brushy Mine—*Owner and Operator,* Little Brushy Coal Co., Atlanta, Ga.; *President,* R. O. Howard, Atlanta, Ga.; *Superintendent,* A. H. Woods, Petros; *Inside Foreman,* O. R. Joyner, Petros.

This mine is composed of four little openings, situated near each other, in the same seam of coal and under the same management. It is located about ½ mile west from Stephens, a station on the Harriman Northeastern Railroad, 13 miles from Harriman. It is a Class C drift mine, operating in the Jellico seam, which measures 33 inches in thickness. Ventilation is produced by furnace and natural conditions. The roof is generally sandstone, but in some sections it is a hard slate, and the bottom sandstone. It is developed on the single entry, room and pillar system. The coal is mostly cut with compressed air machines of the puncher type. Generally speaking this is a damp mine and no dust is found in any part of it. Coal is hauled from rooms and other working places to head of incline, a distance from most extreme part of mine of 1,500 feet, by mules; and from head of incline to tipple at foot, a distance of 1,616 feet, by gravity drum; and then loaded into railroad cars on spur line connecting with Harriman & Northeastern line at Stephens.

MORGAN COUNTY.

Mount Carbon Mine—*Owner,* Mrs. W. C. Walker, Oliver Springs; *Operator,* R. P. Walls, Oliver Springs; *President,* R. P. Walls, Oliver Springs; *Superintendent,* R. P. Walls, Oliver Springs; *Inside Foreman,* J. J. Walls, Oliver Springs.

This is a Class C drift mine. It is located in Cumberland Mountain, 1,400 feet above sea level, 2 miles from Oliver Springs. It connects with the Southern Railroad. The Mount Carbon seam is worked. It has an average thickness of 42 inches. It is developed on the entry and room system. Ventilation is produced by a furnace with 18 feet grate area. Haulage is conducted from rooms to portal, a distance of 300 feet, by mules; from mine to chute, a distance of 2,850 feet, by tram.

MORGAN COUNTY.

Oliver Mine—*Owners,* Richards Bros., Oliver Springs; *Operator,* Oliver Coal Co., Oliver Springs; *President,* W. D. Richards, Oliver Springs; *Superintendent,* W. D. Richards, Oliver Springs; *Inside Foreman,* R. H. McGlother, Oliver Springs.

This is a Class D drift mine. It is located in the Cumberland Mountain, 3½ miles from Oliver Springs. It connects with the Southern Railroad. The elevation is 800 feet above sea level. The Coal Creek seam is worked; it has an average thickness of 48 inches. The roof is slate, and the bottom is fire clay. It is developed on the single entry system. It is ventilated by a furnace, with a grate area of 6 feet. Haulage is conducted from rooms to chute, a distance of 1,200 feet, by mules.

MORGAN COUNTY.

Poplar Creek Mine—*Owner,* Coal Creek Mining & Mfg. Co., Knoxville; *Operator,* Poplar Creek Coal Co., Oliver Springs; *President,* Thos. Pruden, Knoxville; *Inside Foreman,* W. W. Leach, Oliver Springs.

This is a Class A drift mine. It is located in Big Mountain spur of Cumberland Mountain, 4 miles from Oliver Springs. The elevation is 1,150 feet above sea level. The Coal Creek seam is worked; it has an average thickness of 44 inches. The roof is slate, and the bottom is fire clay. It is developed on the double entry and double room system. It is ventilated by a fan, with a diameter of 16 feet. The ventilation is distributed as continuous current. Haulage is conducted from rooms to sidetrack, a distance of 600 feet, by mules; and from sidetrack to tipple, a distance of 1,300 feet, by rope. This mine was not in operation during the year.

MORGAN COUNTY.

Prudential Mine—*Owner,* Coal Creek Mining & Mfg. Co., Knoxville; *Operator,* Prudential Coal Co., Knoxville and Oliver Springs; *President,* J. L. Boyd, Knoxville; *Superintendent,* L. O. Stone, Oliver Springs; *Inside Foreman,* Bob Davis, Oliver Springs.

This is a Class A drift mine. It is located in Brushy Mountain, 4 miles from Oliver Springs, 1,200 feet above sea level. It connects with the Southern Railroad. The Coal Creek seam is worked; it has an average thickness of 48 inches. The roof is slate, and the bottom is fire clay. It is developed on the double entry system. It is ventilated by a furnace, with a grate area of 48 feet; the ventilation is distributed by the continuous current system. Haulage is conducted from room to No. 1 sidetrack, a distance of 1,500 feet, by mules; from No. 1 sidetrack to drum house knuckle, a distance of 2,500 feet, by mules; from drum house to railroad chute, a distance of 1,300 feet, by incline.

MORGAN COUNTY.

Reed Mine—*Owner,* E. A. Read, Trustee, Oliver Springs; *Operator,* Oliver Springs Coal & Clay Co., Oliver Springs; *President,* Wilson Wipple, College Park, Ga.; *Superintendent,* H. B. Downing, Atlanta, Ga.; *Inside Foreman,* R. P. Walls, Oliver Springs.

This is a Class C drift mine. It is located in the Cumberland Mountain, 1 mile from Oliver Springs, and connects with the Southern Railroad. The elevation is 950 feet above sea level. The Coal Creek seam is worked; it has an average thickness of 22 inches. The roof is slate, and the bottom is fire clay. It is ventilated

by a furnace, with a grate area of 35 feet, and the ventilation is distributed by the split system. Haulage is conducted from heading to mine entrance, a distance of 900 feet, by mules; from mine entrance to railroad, a distance of 150 feet, by mules.

MORGAN COUNTY.

State Mine (Brushy Mountain No. 3)—*Owner and Operator,* State of Tennessee, Nashville; *General Manager,* E. W. Essary, Petros; *Superintendent,* A. W. Evans, Petros; *General Inside Foreman,* S. H. Jestes, Petros.

This mine is located at terminus of the Harriman Northeastern Railroad, 1 mile northeast from Petros. It is a Class B drift mine, opened up in the Jellico seam, which has an average thickness of 30 inches, and an elevation of 1,620 feet above sea level. It is developed on the double entry and panel system. The roof is hard blue slate, and the bottom hard fire clay. Ventilation is produced by a 14-foot Jeffrey exhaust fan, producing an average inlet current of 115,407 cubic feet per minute. This mine is operated with State convicts, employing an average inside force of 363. Coal is undercut with electric mining machines and picks. Black powder is the explosive used for breaking down the coal. Generally speaking, this is a damp mine, but some sections are inclined to be dry. Haulage is conducted from rooms to sidetracks, by mules; and from sidetracks to tipple, a distance of 8,000 feet, by electric motors; and from tipple to railroad chute, a distance of 731 feet, by gravity incline. Brushy Mountain No. 1 has now been abandoned.

OVERTON COUNTY.

Brier Hill No. 1 Mine—*Owner and Operator,* The Brier Hill Collieries, Crawford; *President,* W. L. Wagoner, New York; *Superintendent,* Reece Watkins, Crawford; *Inside Foreman,* A. H. Davidson, Crawford.

This is a Class C drift mine, operating in the Bon Air seam, which has an average thickness of 36 inches, and an elevation of 1,690 feet above sea level. It is located at Crawford, on branch line of Tennessee Central Railroad. It is opened up on the double entry, room and pillar system. Ventilation is produced by a 10-foot exhaust fan, with electric connections, and is conducted through the mine by wooden stoppings, and distributed as continuous current. The roof is slate, shale and sandstone, and the bottom hard fire clay. This is a damp mine, and the method of mining is by solid shooting with black powder. Coal is hauled from rooms to sidetracks, by mules; and from sidetracks to tipple, a distance of 4,300 feet, by electric motors.

OVERTON COUNTY.

Brier Hill No. 2 Mine—*Owner and Operator,* The Brier Hill Collieries, Crawford; *President,* W. L. Wagoner, New York; *Superintendent,* Reece Watkins, Crawford; *Inside Foreman,* A. H. Davidson, Crawford.

This mine is located at Crawford, on branch line of Tennessee Central Railroad, connecting with main line at Monterey. It is a Class C drift mine, opened up in the Bon Air seam, having an average thickness of 34 inches and located 1,690 feet above sea level. It is developed on the double entry, room and pillar system. Generally speaking, it is a damp mine, and the method or system of mining is by solid shooting with black powder. The roof is slate and sandstone, and the bottom hard rock. Ventilation is produced by a 10-foot exhaust fan, with electric connections, and is conducted to the headings by wooden stoppings, and distributed as continuous current. Coal is hauled from rooms and other working faces to tipple, a distance of 1 mile, with electric motors.

OVERTON COUNTY.

Obey City Mine—*Owner,* Obey River Coal Co., Nashville; *Operator,* Obey City Coal Co., Obey City; *President,* A. D. Eatherly, Obey City; *Secretary,* C. B. Eatherly, Obey City; *Superintendent and Inside Foreman,* A. D. Eatherly, Obey City.

This is a Class C drift mine, located 1,600 feet above sea level, ½ mile from Obey City, and connects with Wilder Branch of Tennessee Central Railroad. The Bon Air No. 2 seam, having an average thickness of 34 inches, is worked. The roof is shale, and the bottom shale and black jack. It is developed on the partly

double entry and partly single entry system. Ventilation is produced by furnace, with a grate area of 22 feet, and is distributed as continuous current. Haulage is conducted from coal face to outside track, a distance of 1,000 feet, by mules; and from outside track to tipple, a distance of 500 feet, by mules. This mine was not in operation during the latter part of the year.

OVERTON COUNTY.

Overton Mine—*Owner and Operator,* Overton Coal & Coke Co., Davidson; *President,* Robert Officer, Livingston; *Superintendent,* Irvin Allred, Davidson; *Inside Foreman,* W. N. Pope, Davidson.

This mine is located on Davidson Lumber Company's Railroad, 2 miles northwest from Highland Junction. It is a Class C drift mine, operating in the Bon Air seam, which has an average thickness of 5 feet, and an elevation of 1,668 feet above sea level. The roof is hard slate, and the bottom hard rock. It is a damp mine, the coal is hard and solid shooting with black powder is the method of mining. Ventilation is produced by a furnace, with a grate area of 20 feet, and is conveyed through the development by wooden stoppings, and distributed on the continuous current system. Haulage is conducted from rooms to tipple, a distance of 600 feet, by mules; and from tipple to Highland Junction, on Crawford and Wilder branch line of Tennessee Central Railroad, by Davidson Lumber Company's locomotives.

OVERTON COUNTY.

Peacock Mine—*Owner,* Peacock Coal & Coke Co., Lebanon; *Operator,* J. C. Lusk, Monterey, R. F. D. 3; *Superintendent and Inside Foreman,* J. C. Lusk, Monterey, R. F. D. 3.

This mine is located at Obey City, on Crawford and Wilder branch line of Tennessee Central Railroad, 7 miles from Monterey. It is a Class D drift mine, operating in the Bon Air seam, which has an average thickness of 34 inches, and located 1,750 feet above sea level. The roof is slate, and the bottom hard fire clay. It is developed on the single entry system. It is a wet mine. Solid shooting with black powder is generally practiced. Ventilation is produced by furnace, and conveyed through the development by wooden stoppings, and distributed as continuous current. Coal is hauled from rooms to tipple, a distance of 1,000 feet, by mules.

RHEA COUNTY.

Fox No. 1 Mine—*Owned and Operated* by the Durham Coal & Iron Co., Chattanooga, Tenn.; *President,* C. B. Eddy, Chattanooga; *Superintendent,* J. H. Jones, Soddy; *Inside Foreman,* S. P. Loggins, Graysville; *Gas Boss,* H. G. Smith, Graysville.

This mine is located in Walden's Ridge, about 3 miles northwest of Graysville. It is developed on the Nelson No. 2 seam which is 60 inches in thickness, and has an elevation of 950 above sea level. The roof is slaty shale, and the bottom sandstone. The ventilation is produced by a 10-foot fan, and is distributed by continuous current. The mine is worked on the double entry, room and pillar system. Haulage, from rooms to tipple, 4,200 feet, by mules; tipple to railroad, 11,000 feet, by locomotive. This mine connects with the C. N. O. & T. P. Railroad at Graysville. The mine was reported at the first of the year as nearly worked out, and would be abandoned in a short time.

RHEA COUNTY.

Fox No. 2 Mine—*Owned and Operated* by the Durham Coal & Iron Co., Chattanooga; *President,* C. B. Eddy, Chattanooga; *Superintendent,* J. H. Jones, Soddy; *Inside Foreman,* S. P. Loggins, Graysville; *Gas Boss,* H. G. Smith, Graysville.

This mine is located in Walden's Ridge, about 2¼ miles northwest from Graysville. It is a Class A drift mine, developed in the Richland No. 5 seam, which has an average thickness of 30 inches, and an elevation of 1,250 feet above sea level. The roof is slate, and generally very good. The bottom is slate and hard rock. Some parts of this mine are damp, while other sections are inclined to be dry. The coal is dirty and of a soft nature, and is mined principally by solid shooting with black powder. It is developed on the double entry, room and pillar system. The ventilating current is produced by a 12-foot Crawford and McCrimmon exhaust fan,

propelled by steam, and is conveyed to the working faces by means of doors and wooden stoppings, and distributed by the split system. Haulage is conducted from rooms to sidetrack, by mules; and from sidetrack to head of incline on outside, a distance of 3,500 feet, by main and tail rope; and from head of incline to foot, a distance of 450 feet, by drum with steam connection; and from foot of incline to washer, a distance of 3,960 feet, by dinky locomotive; and from washer to C. N. O. & T. P. siding at Graysville, a distance of 11,000 feet, by locomotive.

RHEA COUNTY.

Penn Mine—*Owner and Operator,* Penn. Coal & Lumber Co., Spring City; *President,* John M. Reynolds, Spring City; *Superintendent,* F. H. Enwright, Spring City.

This is a Class D drift mine, located in Walden's Ridge, about 8 miles west from Spring City, on a narrow gauge railroad line. The seam worked, has an average thickness of 30 inches, and an elevation of 1,300 feet above sea level. The roof is sandstone, and the bottom hard fire clay. The coal is of a soft nature and is mined by solid shooting with black powder. It is developed on the single entry and room system. Ventilation is furnished by a very small furnace and is not very well distributed in the headings. Coal is pushed from rooms to tipple on outside, in mine cars, by hand. This mine connects with the C. N. O. & T. P. Railroad at Spring City.

RHEA COUNTY.

Prospect Mine—*Owner and Operator,* Dayton Coal & Iron Co. (Limited), Dayton; *General Manager,* L. C. Crewe, Dayton; *Superintendent of Mine,* W. N. Holden, Dayton, R. F. D. 5; *Inside Foreman,* J. C. Presnell, Dayton, R. F. D. 3; *Gas Boss,* Nelson Rigsby, Dayton, R. F. D. 3.

This is a Class A slope mine, located in the base of Walden's Ridge, 2 miles north from Dayton. It is opened up in the Nelson seam, which has an average thickness of 3 feet, and an elevation of 840 feet above sea level. The roof is a mixture of slate and sandstone shale, and the bottom fire clay and sandstone. The seam at this point is greatly disturbed, and has no regular or uniform formation. In some parts of the mine sandstone and slate bands, varying in thickness from 1 to 6 inches, are distributed through the seam. In some sections of the mine small quantities of explosive gas are liberated, but it is well cared for by ample ventilation. A large quantity of water is liberated in this mine and requires the constant use of two large electric pumps to keep it out, but some sections of it are inclined to be dry and dusty, and it is necessary to allay the dust with water. It is developed on the double entry system, and the method or system of mining is by solid shooting with permissible explosives (monobel). Ventilation is produced by an 8-foot Thayer disc fan, producing an average inlet current of 36,065 cubic feet per minute, and is conducted throughout the development by means of doors and wooden stoppings, and distributed on the continuous current system. Haulage is conducted from rooms to sidetracks, by mules; and from sidetrack to tipple, a distance of 1,550 feet, by drum and rope, with steam connections.

RHEA COUNTY.

Richland Mine—*Owner and Operator,* Dayton Coal & Iron Co. (Limited), Dayton; *General Manager,* L. C. Crewe, Dayton; *Superintendent of Mines,* W. N. Holden, Dayton, R. F. D. 5; *Inside Foreman,* H. C. Morgan, Dayton, R. F. D. 3.

This is a Class B drift mine, located 2½ miles north of Dayton, on company's line of railroad, connecting with C. N. O. & T. P. Railroad at Dayton. The Sewanee seam, located in the base of Walden's Ridge, 985 feet above sea level, and having an average thickness of 22 inches is operated. It is developed on the single entry, room and pillar system. The ventilating current is produced by an 18-foot Crawford and McCrimmon exhaust fan, propelled by steam, producing an average intake current of 32,173 cubic feet of air per minute, which is distributed by the split system and conducted throughout the development by stone and wooden stoppings. This mine in some sections is inclined to be dry and dusty, and requires attention as to sprinkling the dust. A system of water pipe lines throughout the mine with hose attachment is used for wetting the dust. The roof is gener-

ally slate, but in some sections is mixed with sandstone. The bottom is slate and hard rock. The method of mining is by solid shooting with black powder principally. An average of 88 men and 7 mules are employed in this mine. Coal is hauled from rooms to sidetracks, by mules; and from sidetrack to tipple, a distance of 4,480 feet, by main and tail rope; and from tipple to coke ovens and furnace, by locomotive. Operations in this mine were suspended indefinitely the latter part of the year.

ROANE COUNTY.

McLean Mine—*Owner and Operator,* Roane Iron Co., Rockwood; *President,* H. S. Chamberlain, Chattanooga; *Mine Superintendent and Inside Foreman,* J. M. Richards.

This is a Class A slope mine, located on the Cumberland Plateau, 4 miles from Rockwood. It connects with the Tennessee Central Railroad. The Sewanee seam is worked. Thickness irregular with an average of 48 inches. Development by double entry and modification of room and pillar system. The roof is slate, the bottom fire clay. Ventilation by fan 10 feet in diameter. Haulage by mule to slope, and by rope to tipple. Length of slope 1,800 feet.

ROANE COUNTY.

Rockwood Mine—*Owner and Operator,* Roane Iron Co., Rockwood; *President,* H. S. Chamberlain, Chattanooga; *Superintendent of Mines,* W. J. Richards, Rockwood; *Inside Foreman,* W. T. Richards, Rockwood; *Assistant Foremen,* W. H. Elliott and James King; *Gas Bosses,* W. C. Wright, Tom Lane and Frank Dale, Rockwood.

This is a Class A slope mine, located 1,080 above sea level at the base of Walden's Ridge, and extending under the Cumberland Plateau. It is 1 mile from Rockwood, and has connection by the Roane Iron Company's tracks with the Tennessee Central and C. N. O. & T. P. Railroads. No coal, however, is shipped, all of it being coked at the mines with the exception of a small amount used locally. The coal worked is the Sewanee seam; the seam at this point is very irregular, having an average thickness of about 48 inches. The top is slate, the bottom fire clay or sandstone. The mine is developed by three entries on the double entry system, and, by numerous cross entries, slopes and haulways from same. The mining is done on a modification of the room and pillar system. Ventilation is by split system, from a fan 20 feet in diameter. Haulage by mules; also by gravity plane, and air engine, with ropes on slopes to sidetrack, and by gasoline locomotives on the main entries to main slope, and thence by rope on slope. Average distance of motor haul on entries 1½ miles; length of slope 5,000 feet.

SCOTT COUNTY.

Baker Mine (Also known as Arch Mountain Mine)—*Owner,* New River Coal & Coke Co., New York City; *Operator,* Baker Coal & Coke Co., Newland; *President,* Sam P. Sparks, Harriman; *Secretary,* Van D. Sparks, Newland; *Superintendent,* A. McDonald, Harriman; *Inside Foreman,* Sam Van, Newland.

This is a Class C drift mine, located 1,450 feet above sea level, in Arch Mountain, at Newland, and connects with Tennessee Railroad, which connects with the C. N. O. & T. P. Railroad. The Dean seam, having an average thickness of 32 inches, is worked. The roof is slate, and the bottom fire clay and shale. It is developed on the double entry, room and pillar system. Ventilation is produced by furnace, with a grate area of 48 feet, and is distributed as continuous current. Haulage is conducted from working place to mouth of mine, a distance of 500 feet, by mules; from drift mouth to head of incline, a distance of 300 feet, by mules; and from head of incline to railway tipple, a distance of 1,600 feet, by gravity. This mine was not in operation but a short time during the year.

SCOTT COUNTY.

Coffee Mine—*Owner,* Paint Rock Coal Co., Harriman; *Operator, President and Superintendent,* George Coffee, Laxton.

This is a Class C drift mine, located 1,250 feet above sea level, in Cumberland Mountain, 5 miles from Oneida, and connects with Tennessee Railroad. The Paint

Rock seam, having an average thickness of 28 inches, is worked. The roof is slate, and the bottom stone. It is developed on the single entry system. Ventilation is produced by furnace, with a grate area of 30 feet, and is distributed as continuous current. Haulage is conducted from rooms to tipple, a distance of 1,000 feet, by mules. This mine was operated but little during the year.

SCOTT COUNTY.

Glen Mary Mine—*Owner and Operator,* Glen Mary Coal & Coke Co., Glen Mary; *President,* Gus Carter, Glen Mary; *Inside Foreman,* J. M. Carson, Glen Mary.

This mine has an elevation of 1,470 feet above sea level, and is located about 4 miles southeast from Glen Mary. It is a Class C drift mine, opened up in the No. 4 seam, which has an average thickness of 26 inches. There is no well-defined system of development, as this mine consists of several little openings in the same seam and under the same management. Ventilation is furnished in some openings by small furnaces, and in others by natural conditions, and is by continuous current. These little mines in most places are damp and in some parts are wet. The method of mining is by solid shooting with black powder. The roof is slate, and the bottom hard fire clay. These mines employ about 60 men on the inside, producing 200 tons of coal daily. Haulage is conducted from rooms and working places in mines to outside sidetrack, by mules; and from sidetrack to tipple, a distance of 3 miles, by dinky locomotives; and from tipple to Glen Mary Station, on C. N. O. & T. P. Railroad, a distance of 1 mile, by locomotives.

SCOTT COUNTY.

LeMoyne Mine—*Owner and Operator,* J. V. LeMoyne, Baltimore, Md.; *Superintendent,* J. C. Walker, Silerville, Ky.; *Inside Foreman,* John Chambers, Isham, Tenn.

This mine is located 4½ miles south from Isham, and 5 miles east from Winfield. It is a Class B drift mine, developed in the No. 4 seam, which has an elevation of 1,400 feet above sea level, and an average thickness of 30 inches. The roof is slate, and the bottom sandshale. It is opened up on the single entry, room and pillar system. This is a damp mine. Black powder is used for blasting purposes and solid shooting is generally practiced. Ventilation is furnished by a small furnace, and is not well distributed through the working faces. Coal is hauled from rooms in the mine, to head of incline on outside, by mules; and from head of incline to foot, a distance of 100 feet, by gravity drum; and from foot of incline to tipple, a distance of 350 feet, by mules; and from tipple to Isham, on C. N. O. & T. P. Railroad, a distance of 4½ miles, by aerial conveyance. This aerial convey line has 120 buckets, each bucket carrying 1,200 pounds of coal, and requires about 1¼ hours to the trip from mine to station.

SCOTT COUNTY.

Oneida Mine—*Owner,* Paint Rock Coal Co., Harriman; *Operator,* Terry Coal Co., Oneida; *General Manager,* A. C. Terry, Oneida; *Inside Foreman,* Alfred West, Oneida.

This mine has an elevation of 1,450 feet above sea level, and is located on a spur line of the Tennessee Railroad, 4 miles east from Oneida. The Paint Rock seam, having an average thickness of 26 inches is worked. This is a Class B drift mine, and has no defined system of work, as it consists of four little openings. Two of these openings (Stinking Hollow and Eller) are dry and dusty. The roof is slate, and the bottom sandstone. Ventilation is furnished by small furnaces and by natural conditions, and is distributed as continuous current. Coal is mined principally by solid shooting with black powder. Coal is hauled from rooms to tipple, by mules; and from tipple, by locomotives.

SCOTT COUNTY.

Paint Rock No. 1-2 Mine—*Owner,* Paint Rock Coal Co., Harriman; *Operator,* R. A. Woods, Oneida; *Superintendent,* R. A. Woods, Oneida; *Inside Foreman,* Jerry Conners, Laxton.

This is a Class B drift mine, located on the Tennessee Railroad, 5 miles east from Oneida. It is operated in the Paint Rock seam, which has an average thick-

ness of 26 inches, and an elevation of 1,250 feet above sea level. It is developed on the single entry, room and pillar system, and is ventilated by a furnace, with a grate area of 48 feet, producing an inlet current of 4,800 cubic feet of air per minute, which is conducted to the working places by means of wooden stoppings, and distributed as continuous current. The roof is slate, and the bottom rock. In most places this is a dry and dusty mine, and necessitates watering to allay the dust. Solid shooting is generally practiced, and black powder is the explosive used. Coal is hauled from the rooms to the tipple, a distance of 4,000 feet, by mules; and from tipple to Oneida Station, on the C. N. O. & T. P. Railroad, by locomotives, over the Tennessee Railroad.

SCOTT COUNTY.

Paint Rock No. 3 Mine—*Owner,* Paint Rock Coal Co., Harriman; *Operator and Superintendent,* R. A. Woods, Oneida; *Inside Foreman,* Jerry Conners, Laxton.

This mine has an elevation of 1,400 feet above sea level, and is located on the Tennessee Railroad, 5 miles from Oneida. It is a Class B drift mine, developed in the Paint Rock seam, which has an average thickness of 26 inches. The roof is slate, and the bottom rock. It is opened up on the single entry, room and pillar system, and is ventilated by natural conditions. Coal is hauled from rooms and working places in mine to tipple, by mules; and from tipple, by locomotives over Tennessee Railroad to Oneida.

SCOTT COUNTY.

Phillips Mine—*Owner and Operator,* Virginia Mining Co., Roberta; *President,* L. E. Bryant, Roberta; *Inside Foreman,* A. Laxton, Roberta.

This is a Class C drift mine, located 3 miles north of Oneida, and has an elevation of 1,400 feet above sea level, and connects by branch line with C. N. O. & T. P. Railroad at Bear Creek Junction. The seam worked is the No. 4, having an average thickness of 30 inches, with a bone strata or middle slate, varying in thickness from 3 to 10 inches, which adds greatly to the expense of development. The roof is slate, and the bottom fire clay. It is developed on the single entry system, and ventilated by two electric fans, with a diameter of 42 inches each, producing an inlet current of 12,810 cubic feet of air per minute, which is not well distributed in the headings. Coal is all undercut with electric mine machines, and black powder is used for blasting purposes. Coal is gathered and hauled from rooms to tipple, a distance of 2,000 feet, by electric motors. This mine employs about 35 men, and generally speaking is a wet mine.

SCOTT COUNTY.

Pine Knot Mine—*Owner,* Paint Rock Coal Co., Harriman; *Operator,* Pine Knot Coal Co., Oneida; *President,* D. Denny, Harriman; *Inside Foreman,* George Chambers, Laxton.

This mine has an elevation of 1,340 feet above sea level, and is located on the Tennessee Railroad, 6 miles from Oneida. The Paint Rock seam is worked, and has an average thickness of 24 inches. This mine has no well-defined system of development, as it is made up of three little openings in the outcrop. It is a Class C drift mine, developed on the single entry and room plan. Ventilation is furnished by small furnaces, and natural means. Solid shooting is practiced and the explosive used is black powder. This is a damp mine. Coal is hauled from rooms to tipple, by mules; and from tipple, by locomotives on spur line to Tennessee Railroad.

SCOTT COUNTY.

Rosser Mine—*Owner and Operator,* Virginia Mining Co., Roberta; *President,* L. E. Bryant, Roberta; *Inside Foreman,* A. Laxton, Roberta.

This is located 2½ miles southwest from Winfield, and connects by branch line with C. N. O. & T. P. Railroad, at Bear Creek Junction. The No. 4 seam, having an average thickness of 42 inches, is worked. It is developed on the single entry, room and pillar system. Ventilation is furnished by a 42-inch electric exhaust fan, and is distributed on the continuous current system. This mine has a band of mid-

dle slate in the coal, varying in thickness from 3 to 10 inches. The roof is slate, and the bottom fire clay. Generally speaking, this is a damp mine. About 25 men are employed inside. Haulage is conducted by electric motors, from rooms to tipple, a distance of 1,500 feet.

SCOTT COUNTY.

Southern Clay Mine—*Owner and Operator,* Southern Clay Mfg. Co., Chattanooga; *President,* W. M. Lasley, Chattanooga; *Inside Foreman,* J. C. Pemberton, Robbins.

This is a Class D drift mine, located at Robbins, on the C. N. O. & T. P. Railroad. The Glen Mary No. 4 seam, having an average thickness of 24 inches, and an elevation of 1,400 feet above sea level, is worked. The roof is slate, and the bottom fire clay. It is opened up on the single entry, room and pillar system. Ventilation is produced by a small furnace, and is generally not well distributed in the working faces. This is a damp mine. The method of mining is principally by solid shooting with black powder. Coal is hauled from rooms to tipple, by mules.

SCOTT COUNTY.

Stanley Nos. 1 & 2 Mines—*Owner,* Paint Rock Coal Co., Harriman; *Operator,* Stanley Coal Co., Oneida; *Superintendent,* A. McDonald, Harriman; *Inside Foreman,* George Chambers, Laxton.

This mine is opened up in the Paint Rock seam, having an average thickness of 30 inches, and located 1,300 feet above sea level. It is a Class B drift mine, located 4 miles east from Oneida, and connects with Tennessee Railroad by spur line. It is developed on the single entry system. The coal is of a dry and dusty nature, and the method of mining is by solid shooting, with black powder. The roof is slate, and the bottom sandstone. Ventilation is produced by a small furnace, and is conveyed through the workings on the continuous current system. Coal is hauled from working places in the mine to tipple, by mules; and from tipple over Tennessee Railroad, by locomotives, connecting with the C. N. O. & T. P. Railroad at Oneida.

SCOTT COUNTY.

West Hollow Mine—*Owner and Operator,* Virginia Mining Co., Roberta; *President,* L. E. Bryant, Roberta; *Inside Foreman,* G. W. Strunk, Roberta.

This is a Class D drift mine, located 2 miles southwest from Winfield, connecting with the C. N. O. & T. P. Railroad by branch line, at Bear Creek Junction. It is opened up in the No. 4 seam, which has an average thickness of 30 inches, and an elevation of 1,400 feet above sea level. The roof is slate, and the bottom fire clay. This seam has a band of middle slate in the coal which has greatly deterred the development of the mine. The coal is undercut with electric mine machines, and broken down by blasting with black powder. It is developed on the single entry, room and pillar system, and ventilated by a 42-inch electric exhaust fan. This is a very wet mine, and the haulways are muddy. Haulage is by mules, from rooms to tipple.

SEQUATCHIE COUNTY.

Douglas Mine—*Owner,* Southern I. & S. Co., Birmingham, Ala.; *Operator,* C. E. Buck, and H. S. Geismer, *Receiver,* Chattanooga; *Superintendent,* John M. Smith, Dunlap; *Inside Foreman,* John Dagnan, Dunlap.

This is a Class C drift mine, located 1,667 feet above sea level, in Cumberland Mountain, 1 mile from Dunlap, and connects with N., C. & St. L. Railway. The Sewanee seam, having an average thickness of 48 inches, is worked. The roof is slate and the bottom fire clay. It is developed on the double entry and double room system. Ventilation is produced by fan, with a diameter of 12 feet, and is distributed by the split system. Haulage is conducted from rooms to sidetrack, a distance of 1,500 feet, by mules; from sidetrack to mine entrance, a distance of 4,500 feet, by tail rope; from mouth of mine to tipple, a distance of 3,900 feet, by locomotive; and from tipple to chute at railroad, a distance of 3,900 feet, by gravity drum.

WHITE COUNTY.

Bon Air (Shaft) Mine—*Owner,* Bon Air Coal & Iron Co., Nashville; *Operator,* Robert Vaughn, and E. C. Lewis, *Receivers,* Nashville; *Superintendent,* W. F. Dibrell, Bon Air; *Inside Foreman,* S. A. Rhinehart, Bon Air.

This mine has an elevation of 1,857 feet above sea level, and located 1½ miles east from Bon Air Station, on N., C. & St. L. Railway. It is a Class C shaft mine, operating in the Bon Air seam, having an average thickness of 3 feet. The roof is slate, and the bottom hard fire clay. It is developed on the double entry, room and pillar system. Coal is undercut with electric mining machines and broken down with black powder. Generally speaking, this is a damp mine, but some sections are inclined to be a little dry. The ventilating current is furnished by a 15-foot Buffalo exhaust fan, producing an inlet current of 30,000 cubic feet of air per minute, which is conveyed to the working faces by wooden stoppings, and distributed by the split system. Haulage is conducted from rooms and other working places to shaft landing, by electric motors; and from shaft landing to tipple, a distance of 212 feet, by steam hoist.

WHITE COUNTY.

Bon Air No. 6 Mine—*Owner,* Bon Air Coal & Iron Co., Nashville; *Operator,* Robert Vaughn, and E. C. Lewis, *Receivers,* Nashville; *Superintendent,* W. F. Dibrell, Bon Air; *Inside Foreman,* William Morrow, Bon Air.

This is a Class C drift mine, operating in the Bon Air seam, which has an average thickness of 36 inches, and an elevation of 1,646 feet above sea level. It is located about ½ mile from Bon Air Station, and connects with the N., C. & St. L. Railroad. The roof is slate, and the bottom fire clay. This mine has no well defined system of work, as it consists of three openings, and robbing being the only work. Ventilation is furnished by fan and natural conditions. Coal is hauled from working faces, a distance of 1,000 feet to tipple, by mules.

WHITE COUNTY.

Clifty Creek No. 1 Mine—*Owner and Operator,* Clifty Consolidated Coal Co., Clifty; *President,* R. R. Moody, Springfield, Mass.; *General Manager,* Dr. Young, Clifty; *Superintendent,* C. W. Bell, Clifty; *Inside Foreman,* Joe Ledford, Clifty.

This is a Class C drift mine, operating in the Sewanee seam, which has an average thickness of 36 inches. It has an elevation of 1,600 feet above sea level, and is located ¼ mile from Clifty, and connects with the Nashville, Chattanooga & St. Louis Railway. The roof is sandstone and generally very good and safe, and the bottom fire clay. The coal is hard and is shot from the solid with black powder. Generally speaking, this is a damp mine, and some parts of it are wet. It is developed on the double entry system; and is ventilated by a furnace, with a grate area of 50 feet, and the ventilation is distributed through the development by the split system. Coal is hauled from headings to tipple, an average distance of 4,500 feet, by mules.

WHITE COUNTY.

Clifty Creek No. 3 Mine—*Owner and Operator,* Clifty Consolidated Coal Co., Clifty; *President,* R. R. Moody, Springfield, Mass.; *General Manager,* Dr. Young, Clifty; *Superintendent,* C. W. Bell, Clifty; *Inside Foreman,* Joe Ledford, Clifty.

This mine is located about ½ mile southwest from Clifty Station, and connects with the N., C. & St. L. Railway. The Sewanee seam, having an average thickness of 42 inches, is worked. It is a Class C drift mine, elevated 1,600 feet above sea level, and developed on the double entry, room and pillar system. The roof is slate and shale, and in some parts of the mine is very dangerous, and requires careful timbering to make it safe. The bottom is of a fire clay nature. The coal is inclined to be soft, and is shot from the solid with black powder. Generally, this is a damp mine, with some parts rather wet. Ventilation is produced by a furnace, with 15 feet grate area, and the current is conducted to the headings by means of doors and wooden stoppings, and distributed by the split system, and is generally very deficient. An average of 80 men and 8 mules are employed on the inside work of this mine. Coal is hauled from rooms and headings to tipple, an average distance of about 2,000 feet, by mules.

WHITE COUNTY.

Eastland No. 1 Mine—*Owner,* Bon Air Coal & Iron Co., Nashville; *Operator,* Robert Vaughn, and E. C. Lewis, *Receivers,* Nashville; *Superintendent,* W. F. Dibrell, Bon Air; *Inside Foreman,* George Thom, Sr., Eastland.

This mine is located at Eastland, and connects with Nashville, Chattanooga & St. Louis Railroad. It is a Class C drift mine, operating in the Sewanee seam, which has an average thickness of 48 inches. It has an elevation of 1,800 feet above sea level. The roof is slate and shale, and the bottom fire clay. It is opened up on the simple entry, room and pillar system, and ventilated by a 17-foot Vulcan exhaust fan. The inlet current is conducted to the headings by wooden stoppings, and distributed by the split system. Most parts of this mine are very damp, and in some places the main haulway is wet and muddy. Coal is mined by shooting from solid with black powder. Coal is hauled from rooms to yard at mine entrance, an average distance of about 2,000 feet, by mules, thence with car, with endless rope, 195 feet to tipple.

WHITE COUNTY.

Eastland No. 2 Mine—*Owner,* Bon Air Coal & Iron Co., Nashville; *Operator,* Robert Vaughn, and E. C. Lewis, *Receivers,* Nashville; *Superintendent,* W. F. Dibrell, Bon Air; *Inside Foreman,* George Thom, Sr., Eastland.

This is a Class C drift mine, operating in the Sewanee seam, located 1,800 feet above sea level, and having an average thickness of 48 inches. It is located about 1 mile from Eastland, and connects with N., C. & St. L. Railway. The roof is slate, and the bottom fire clay. There is no defined method of working this mine now, as the work being done is principally robbing. Coal is hauled from rooms to tipple, by mules.

WHITE COUNTY.

Ravenscroft Mine—*Owner,* Bon Air Coal & Iron Co., Nashville; *Operator,* Robert Vaughn, and E. C. Lewis, *Receivers,* Nashville; *Superintendent,* W. F. Dibrell, Bon Air; *Inside Foreman,* Wm. Morrow, Ravenscroft.

This mine is located at Ravenscroft, 1,879 feet above sea level, and connects with N., C. & St. L. Railway. It is a Class C. shaft mine, operating in the Bon Air seam, which has an average thickness of 54 inches. The roof is sandstone, and the bottom rash and fire clay. It is developed on the double entry, double room and pillar system. Most of the coal is undercut with compressed air mining machines of the puncher type, and broken down with black powder. Ventilation is produced by a 10-foot Capelle exhaust fan, propelled by steam, and is distributed through the development by the split system. This is in general a very wet mine, and requires 15 pumps of various sizes going to keep it out. Coal is hauled from rooms to sidetrack, by mules; and from sidetrack to cage landing, a distance of 1,300 feet, by main and tail rope; and from cage landing at bottom of shaft to top, a distance of 187 feet, by steam hoist.

MINERAL PRODUCTS OF TENNESSEE OTHER THAN COAL

This section of the report takes up the development of the various mineral resources of the state other than coal, which is considered in the first part of the report. The detailed production, usually by counties, is taken up with tables showing the various statistics.

In most cases there is added, especially where the mineral is, or may be, an important one in this state, such descriptive matter as it is thought may be interesting or valuable. In a number of cases tables showing relative production of the various states, or different countries, have been added for the purpose of comparison. A number of such tables heretofore included in this report have however been omitted, as such information can be obtained from "Mineral Resources of the United States," published by the United States Geological Survey.

BARYTES

Cocke, Jefferson and Sevier counties all have considerable deposits of barytes. But at the present time market conditions are such that its production is not very profitable. The duty on imported raw barytes was increased by the Payne-Aldrich bill from 75 cents to $1.50 per long ton; but the duty on the manufactured product remained the same. This increase of duty on the raw material had little effect in keeping it out, since in 1910, the second year after the law went into effect, the imports increased from 11,642 short tons to 21,270 short tons. The value of the imported material decreased after the increase in the tariff. The average wholesale price of American ground barytes in New York in 1910 was $13.50 per short ton. The price was $14.75 per short ton the year before.

Barytes is used chiefly in the manufacture of mixed paints. It is used also in the manufacture of lithophone, rubber, wall paper, asbestos, cement, poker chips and in tanning leather.

This table gives the total product and the value of barytes produced in Tennessee for 1911 as compared with 1910.

Barytes product and value in Tennessee in 1911, *compared with* 1910.

COUNTY	1911						1910		Increase + or Decrease −	
	Employees			Product			Product			
	Average Number	Average Wages Paid per Day	Total Wages Paid	Quantity (Short Tons)	Value	Value per Ton	Quantity (Short Tons)	Value	Product (Short Tons)	Value
Loudon	10	------	-------	900	$ 1,125	$ 1.25	1,000	$ 1,000	− 100	+ $ 125
McMinn	16	------	-------	1,164	1,446	1.24	-------	-------	+ 1,164	+ 1,446
Monroe	18	------	-------	2,042	2,508	1.23	800	1,000	+ 1,242	+ 1,508
Total	44	$ 1.10	$ 3,999	4,106	$ 5,079	$ 1.24	1,800	$ 2,000	+ 2,306	+ $ 3,076

BARYTES.

The following tables gives the production of crude barytes in the United States from 1908 to 1910, by States, and shows the average price per ton in the producing localities.

Production of crude barytes in the United States, 1908-1910, by States, in short tons.

STATE	1908			1909			1910		
	Quantity	Value	Average Price per Ton	Quantity	Value	Average Price per Ton	Quantity	Value	Average Price per Ton
Kentucky	5,233	$ 21,504	$ 4.11	(a)	(a)		(a)	(a)	
Missouri	16,319	56,768	3.48	34,815	$119,818	$ 3.44	22,978	$ 75,598	$ 3.29
North Carolina	(a)	(a)		(a)	(a)		(a)	(a)	
Tennessee	8,618	12,313	1.43	(a)	(a)		4,729	7,281	1.54
Virginia	(a)	(a)		(a)	(a)		(a)	(a)	
Other States b	8,357	29,857	3.51	27,130	89,919	3.31	15,268	38,867	2.55
Total	38,527	$ 120,442	$ 3.13	61,945	$ 209,737	$ 3.39	42,975	$ 121,746	$ 2 83

a Included in other states.

b Includes 1908, Georgia, North Carolina, and Virginia; 1909, Georgia, Kentucky, North Carolina, Tennessee, and Virginia; 1910, Georgia, Kentucky, North Carolina, and Virginia.

The following table gives the production of crude barytes in short tons from 1882 to 1910, inclusive, for the United States.

Production of crude barytes, 1882-1910.

	Short Tons		Short Tons
1882	22,400	1897	26,042
1883	30,240	1898	31,306
1884	28,000	1899	41,894
1885	16,800	1900	67,680
1886	11,200	1901	49,070
1887	16,800	1902	61,668
1888	22,400	1903	50,397
1889	21,460	1904	65,727
1890	21,911	1905	48,235
1891	31,069	1906	50,231
1892	32,108	1907	89,621
1893	28,970	1908	38,527
1894	23,335	1909	61,945
1895	21,529	1910	42,975
1896	17,068		

BAUXITE

"The chief uses of bauxite are (1) as raw material in the production of metallic aluminum, (2) in the manufacture of aluminum salts, (3) in the manufacture of artificial abrasives, and (4) in the manufacture of bauxite brick."[1]

Bauxite was discovered in America in 1887, a few miles north of Rome, Ga. Ore shipments were made from that point in 1889. In 1891 shipments were made from Alabama; and about the same time large deposits were found in Arkansas. It has been mined now about five years in Tennessee. Only one mine is in operation in this state. This mine is situated on the east side of Missionary Ridge, near Chattanooga. The mine consists of a rounded pit perhaps 200 or 300 feet in diameter and 100 feet or more deep.

The bauxite was first found at this point in a well, which may still be seen on the east side of the pit. Below the stripping, which contains a small proportion of scattered bauxite ore, the main deposit forms practically a solid mass, the full depth of the pit and more, as the bottom of the deposit has not yet been reached.[2]

[1] U. S. G. S., p. 712.
[2] Resources of Tennessee, December, 1911.

The following table shows the result of bauxite operations in Tennessee in 1911.

Average number of employes	25
Average wages paid per day	$ 1.50
Total amount paid for labor	$ 7,500
Total quantity of bauxite (long tons)	3,265
Total value of product	$11,428
Number of pits	1

Production of bauxite in the United States, 1889-1910, by States, in long tons.

YEAR	Georgia	Alabama	Arkansas	Total	Value
1889	728			728	2,366
1890	1,844			1,844	6,012
1891	3,301	292		3,593	11,675
1892	5,110	5,408		10,518	34,183
1893	2,415	6,764		9,179	29,507
1894	2,050	9,016		11,066	35,818
1895	3,756	13,313		17,069	44,000
1896	7,313	11,051		18,364	47,338
1897	7,507	13,083		20,590	57,652
1898				25,149	75,437
1899	15,736	14,499	5,045	35,280	125,598
1900	19,739		3,455	23,184	89,676
1901	18,038		867	18,905	79,914
1902	22,677		4,645	27,322	120,366
1903	22,374		25,713	48,087	171,306
1904	21,913		25,748	47,661	235,704
1905	15,173		32,956	48,129	240,292
1906	25,065		50,267	75,332	368,311
1907				a97,776	480 330
1908	14,464		a37,703	52,167	263,968
1909	22,227		a106,874	129,101	679,447
1910	33,096		a115,836	148,932	716 258

a Production of Tennessee included.

CEMENT

Composition and definition.—Portland cement may be and it is manufactured from a variety of materials. The chief ingredients used in this country are limestone and clay. Instead of limestone, the calcareous ingredients necessary may be supplied by marl, chalk, etc., while the argillaceous ingredients may come from shale, slate, blast furnace slag, or cement rock (which contains both lime and clayey matter).

Following is the definition proposed by E. C. Eckels for cement specifications:

"By the term Portland cement, as used in these specifications, is to be understood the product obtained by finely pulverizing clinker produced by burning to semi-fusion an intimate artificial mixture of finely ground calcareous and argillaceous materials, this mixture consisting approximately of three parts of lime carbonate (or an equivalent amount of lime oxide) to one part of silica, alumina and iron oxide. The ratio in the finished cement of lime to silica, alumina and iron oxide together, shall not be less than 1.6 to 1, nor more than 2.3 to 1."

RAW MATERIALS FOR PORTLAND CEMENT MANUFACTURE.

There are a number of factors concerned in determining the possible value of a deposit of raw material for Portland cement manufacture. The most important of these are:

1. The chemical composition of the material.
2. The physical character of the material.
3. The amount of material available.
4. The location of the deposit with respect to transportation routes.
5. The location of the deposit with respect to fuel supplies.
6. The location of the deposit with respect to markets.

As there are a number of places in East Tennessee where the three last factors in the above enumeration are favorable, the location of a cement plant in this region may be found to hinge primarily on the conditions applying to the first three factors, viz., the composition, physical character and availability of the raw materials.

Chemical composition.—Portland cement consists approximately of three parts of lime (CaO) to one of silica (SiO_2), or 73.6 per cent of lime and 26.4 per cent of silica. However, alumina is always present in considerable quantity, taking the place of a part of the lime. The average composition as shown by actual analyses may be seen from the following, selected from different brands of United States Portland cement manufacture:

CHEMICAL COMPOSITION OF AMERICAN CEMENTS.

	SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	Alk.	SO_3
Ala. P. C. Co. Red Diamond	19.56	12.16		62.27	0 64	-------	0.54
Pacif. P. C. Co. Golden Gate	22.57	10.64		62.61	1.27	-------	1.32
Mich. P. C. Co. Wolverine	21.02	7.51	3.83	63.95	1.05	0.98	1.50
Alpha P. C. Co. Alpha N. J.	22.89	8.00	2.44	63.38	2.30	-------	-------
Lehigh P. C. Co. Lehigh, Pa.	22.13	9.56		62.63	2.51	-------	1.49
Alma P. C. Co. Alma, Ohio	21.63	6.70	4.75	63.58	1.10	-------	1.15
Average	21.63		10.76	63.07	1.47	-------	1.20

In general, the range of the three main ingredients is as follows:

Lime (CaO), 58 to 67%; Silica (SiO_2), 19 to 25%; Alumina (Al_2O_3), 5 to 10%; Iron (Fe_2O_3), 1 to 5%; Magnesia, usually from 1 to 4%.

Kinds of material used.—In preparing a mixture for burning that will give a composition corresponding to that shown by the above analyses it is necessary to take into account the accidental impurities that may be present in the mixture and those that may be added to serve some useful purpose. Of the latter is calcium sulphate (gypsum), which serves to retard the set of the cement, and in small quantities appears to have no injurious effects. Iron oxide within reasonable limits may act as a substitute for the alumina, and is usually calculated with that substance. Magnesium carbonate is rarely absent from limestones or clays, and by some is considered as positively detrimental, but at best it may be considered as an inert and valueless constituent. This is due to the fact that while magnesia, obtained by burning magnesium carbonate at low temperature, is an active hydraulic material, it does not normally combine with silica or alumina when burned at the clinkering heat employed in Portland cement manufacture. It is desirable therefore to keep the proportion of magnesia to a low limit. In amounts below 5 per cent it is harmless, and hence the limit usually allowed is 4 per cent.

Materials suitable.—It is evident therefore that for cement manufacture the materials used must be of the correct chemical composition.

The various combinations that may be used are as follows:

1. Argillaceous hard limestone (cement rock), and pure limestone.
2. Pure hard limestone and clay (or shale).
3. Soft (chalky) limestone, and clay (or shale).
4. Marl, and clay (or shale).
5. Alkali waste, and clay.
6. Slag, and pure limestone.

Lenoir Limestones.—These limestones usually outcrop in connection with the marbles, but appear also in areas where no marble is found. This rock has two phases, the upper beds being more or less argillaceous, or having more or less clay in their composition; while the lower beds consist of compact blue limestone. The magnesia in the compact blue limestone is well within the limits prescribed for Portland cement, and in other respects the rock seems to meet all requirements.

Mississippi Limestone.—Limestone of the Mississippi age outcrops along the eastern base of the Cumberland Plateau in locations where quarrying may be carried on successfully. Sometimes this is known as Bangor limestone, and sometimes it is called Newman limestone.

The Cumberland Gap region was investigated for cement materials by E. C. Eckels of the United States Geological Survey, and the Newman limestone was recommended as suitable for that purpose.

Clays, or Shales.—The location of suitable clay, or shale, is a more difficult problem than that of the limestone. While there are many shale formations in the eastern portion of the state, the fact that the supplies must be drawn from some point near the limestone quarries limits the range of selection to those shale formations that lie contiguous to the limestone formations, or at most but a short distance away. Moreover, they must be free from sand or chert, or very nearly so.

Grainger Shale.—If the Newman limestone is to be used, the necessary deposits of shale will be found in the Grainger formation which lies stratigraphically below the limestone.

CEMENT.

Sevier, Athens or Nolachuckey Shales.—These formations outcrop in considerable areas in the valley, and it is probable that one or more of them will in places furnish suitable material for cement. No analyses of any of these are at hand, and until such are obtained no definite statement as to their qualities can be made. In some places the Athens and Sevier seem to have considerable sand in them, but in others they are mostly free from sand. Extensive outcrops of these shales occur in association with the marble and Lenoir limestone formations, and hence are promising candidates for favor in the selection of cement materials.

Chattanooga Shale.—This formation extends in a narrow band along the eastern base of the Cumberland escarpment, and according to the U. S. Geological Survey report, is adapted for cement manufacture.

Localities Favorable for Cement Plants.—In the presence of inexhaustible supplies of marble, limestone and shales, the proximity of coal supplies, facilities of transportation and all the conditions suitable for the establishment of a prosperous industry, Knoxville leaves nothing to be desired. The Holston marble and the Chickamauga limestone outcrop in the vicinity of the city in abundance. Shale formations abound, coal in abundance lies at her doors, and with railroad and river transportation at hand every factor is met.

Practically any place on the Southern Railway south of Knoxville, as far as Sweetwater, and north as far as Friends Station, will be close to the Holston marble and supplies of shale.

The Newman and Bangor limestones and other materials are also available all along the east front of the Cumberland Mountains. In Middle Tennessee these limestones are available all along the west fall of the Cumberland Plateau. Nashville has local limestones highly suited for making cement, though some difficulty might be experienced in obtaining a local supply of clay or shale.

Iron City has a limestone well-suited for making cement, and the Chattanooga shale is near at hand. A number of high-grade limestones outcrop along the Louisville & Nashville Railroad, between Clarksville and Paris, and marble is found near Cumberland City, and on the Big Sandy River near Big Sandy, and by a mixture with the pure clays of Henry County should make an excellent cement.

The above facts on cement materials, etc., in Tennessee were taken from "Cement Resources and Possibilities," by C. H. Gordon. This article was published in the August, 1911, number of "The Resources of Tennessee."

The following table shows the result of cement operations in Tennessee in 1911:

COUNTY	1911 Employes: Average Number	Average Wages Paid per Day	Total Wages Paid	1911 Product: Quantity (Bbls	Value	Value per (Bbls.)	1910 Product: Quantity (Bbls.)	Value	Increase + or Decrease —: Product (Bbls)	Value
Marion	400	------	--------	1,110,453	$ 800,000	$ 0.72	770,000	$ 478,893	+340,453	+$ 321,107
Sullivan	70	------	--------	100,000	70,000	0.70	----------	----------	+100,000	+ 70,000
Total	470	$ 1.74	$ 261,966	1,210,453	$ 870,000	$0.72	770,000	$ 478,893	+440,453	+$ 391,107

Production of Portland Cement in the United States in 1909 *and* 1910, *by States.*

1909 STATE	Producing Plants	Quantity (Bbls.)	Value	1910 STATE	Producing Plants	Quantity (Bbls.)	Value
Pennsylvania	24	22,869,614	$ 15,969,621	Pennsylvania	25	26,675,978	$ 19,551,268
Indiana	6	7,026,081	5,331,468	Indiana	5	7,219,199	6,487,508
Kansas	11	5,334,299	3,792,764	Kansas	11	5,655,808	5,359,408
Illinois	5	4,241,392	3,388,667				
New Jersey	3	4,046,322	2,813,162	California	7	6,385,588	8,843,210
Missouri	4	3,445,076	2,808,916	Washington	2		
Michigan	12	3,212,751	2,619,259				
				Illinois	5	4,459,450	4,119,012
California	6	4,455,714	6,785,764	Missouri	4	4,455,589	3,858,088
Washington	2			New Jersey	3	4,184,698	3,067,265
				Michigan	12	3,687,719	3,378,940
New York	7	2,139,884	1,859,169	New York	8	3,296,350	2,906,551
Ohio	8	1,813,521	1,359,245				
				Texas	4	2,287,445	2,664,846
Iowa	1	1,265,944	1,117,338	Oklahoma	2		
Kentucky	1						
West Virginia	1			Iowa	2	2,010,379	1,986,694
				Kentucky	1		
Texas	3	1,438,021	1,519,267	West Virginia	1		
Oklahoma	2						
				Ohio	5	1,527,670	1,279,717
South Dakota	1	1,019,328	1,024,317				
Colorado	2			Alabama	2	1,481,359	1,323,495
				Georgia	1		
Arizona	1	663,679	923,817	Tennessee	1		
Utah	2						
				Maryland	1	1,206,158	830,218
Maryland	1	949,331	667,163	Virginia	2		
Virginia	1						
Massachusetts	1			Arizona	1	1,204,761	1,543,620
				Colorado	2		
Alabama	1	1,070,474	878,387	Montana	1		
Georgia	1						
Tennessee	1			Utah	3	811,800	1,005,960
Total	108	64,991,431	$ 52,858,354	Total	111	76,594,951	$ 68,205,800

CEMENT.

Average price per barrel of Portland Cement, 1870-1910, for United States.

1870-1880	$ 3.00	1893	$ 1.91	1903	$ 1.24
1881	2.50	1894	1.73	1904	.88
1882	2.01	1895	1.60	1905	.94
1883	2.15	1896	1.57	1906	1.13
1884	2.10	1897	1.61	1907	1.11
1885-1888	1.95	1898	1.62	1908	.85
1889	1.67	1899	1.43	1909	.813
1890	2.09	1900	1.09	1910	.891
1891	2.13	1901	.99		
1892	2.11	1902	1.21		

CLAY

Tennessee has exceptionally good deposits of clay. These deposits occur between the Tennessee and the Mississippi Rivers. These clays have a peculiar interest in that West Tennessee is at present furnishing probably the finest ball clay obtained in the United States, as well as sagger, wad and other fine clays, not to mention clays for terra cotta, tile, brick and fire clays. These ball clays have also a large future interest in that the exportation of ball clay from Engand, the principal source of supply in the past, may be stopped by law in the near future. These clays are of several varieties, but the most valuable are the ball clays which are used in the manufacture of many different kinds of wares, such as china ware, porcelain, high voltage electric insulators, sanitary ware, vases and jardinieres. These numerous articles are all manufactured out of the state; afterwards many of them are shipped back to be sold.

The ball clays found in this section are as good as any in the United States, and have already a large and permanent market in the North, where they are eagerly sought after; the demand always being larger than the output. They are at present mined only in Henry County.

Good grades of potter's clay are found in many of the counties, and are shipped as well as used locally. At present the local use is small. Fire and brick clays are found in practically all of the counties, but at present fire brick are only manufactured at one locality, Gilmore, Madison County, while the ordinary brick are made in all the towns of any importance. Practically the whole surface of West Tennessee could be utilized in the making of common brick.

Any place in West Tennessee has surface clays suitable for brick making, while the fine white plastic clays occur in two belts, the principal one extending across the state from Paris in the north to Grand Junction in the south; the other and smaller band extends from India 5 miles east of Paris, to Lexington on the south.

CLAYS OF THE AREA.

Definition of Clays of Area.

Kaolin.—This is a clay which approaches most nearly the mineral kaolinite in composition. It is usually formed from the decomposition of feldspars; but the few bands of from 1 to 12 inches thick which are found in West Tennessee must be derived from the chert of the near-by Paleozoic limestone as there are no feldspars in this neighborhood from which they might have had their origin. The only kaolin seen was a layer several inches thick, found among the clays in the pit of the Henry Clay Company, near Henry, Henry County, although it occurs in several other places.

CLAY.

Ball Clay.—Ball clays are those that have a high degree of plasticity, are white after burning, and are of sedimentary origin. They are used on account of their high plasticity as a bond in mixtures of nonplastic clays in the manufacture of white ware. Their tensile strength should be good and they should be tough and waxy. They should be free, or practically so, from iron and grit. Their fusibility varies greatly, having a wide range, but refractoriness is to be desired. Those found in West Tennessee generally burn to a dense, vitrified body at cone 8 or 9 and show a shrinkage around 15 per cent. They differ from the English ball clays in only having 1 to 2 per cent felsphatic matter, while the English contain 15 per cent to 20 per cent. Like the English clays, they have a vitreous fracture. These clays are sometimes washed before being used. Outside of Tennessee other important deposits of ball clay occur at Edgar, Fla., Woodbridge, N. J., and Mayfield, Ky.

Sagger Clay.—The sagger clays of this region are generally gotten from the edges and top of the ball clay pits, where the impurities in the ball clay unfit it for use as such. A sagger clay is so called as it is used to make the receptables called saggers in which the better grades of ware are inclosed before burning. On this account they should be very plastic and tough, and have little shrinkage, so as to hold together without cracking. They should also be refractory. The raw clay is often mixed with a crushed burnt clay in the manufacture of the saggers.

Wad.—Wad clay is very much like sagger clay, but does not have to be as tough or plastic. It is used for various purposes; for an example, to make a band around the top of a sagger on which another sagger is superimposed. The best wad found in West Tennessee is in Henry County. This wad will not "spit" or "fly," nor will it stick to the saggers.

Potter's Clay.—Clays of this class must have good plasticity. This is necessary in order for the clay to be molded and to retain its shape until the clay is dried and burned.

The following are the properties required in a potter's clay, as given by Wheeler:

(1) Eminently plastic, (2) free from coarse sand or other coarse foreign matter, (3) as free from iron as possible, (4) capable of burning to a close incipiently vitrified body at a temperature less than 2200° F., (5) should have a range of at least 200° between the point of incipient and complete vitrification, (6) capable of frying and heating at moderate speed without the employment of grog, (7) tough and strong body when burned, (8) free from corbuate, sulphates, or other salts that are liable to cause blisters in burning.

All of the potter's clays found in West Tennessee are along the western out-crop of the LaGrange formation and the western edge of the Ripley land. Pits are located near McKenzie, Hico, Toone, Pinson, and Grand Junction in the LaGrange formation; and at Hollow Rock in the Ripley beds. The potter's clay in West Tennessee is commonly used in the manufacture of crocks, churns, jugs, jars, dishes, flowerpots, and similar wares.

Common Brick.—These clays must have sufficient plasticity to be easily molded. They should burn to a dense hard body at a low temperature. The chemical composition, except in a wide range, is not of very much importance, but the physical properties will greatly help in determining the methods to be used in manufacturing the brick.

CLAY.

Colors.—Iron gives a red color to brick, while lime or magnesia gives cream or buff colors when present in considerable quantities.

Drainage Tile Clay.—The clays used for drainage tile are similar to those used for common brick, any plastic clay that will burn to a porous body that will dry without cracking, and that has a fair degree of strength, can be used for such a purpose.

At present there is only one plant in West Tennessee which manufactures only drain tiles. This is located at Union City, in Obion County, the clay that is used being the dark layer of the Columbia loess. There is any amount of this clay available for such use in all the counties along the Mississippi River, while in the counties further east the same beds of the Lafayette and Ripley formations that are used for brick could be used for tile. The demand for drain tiles has, up to the present, been limited, but with the formation of drainage districts, which has recently been commenced, a great demand for them should come into existence. This industry should therefore at the present time offer a good field for investments.

Fire Brick Clay.—Most good fire bricks are made from mixtures of plastic and non-plastic clays which are very refractory, but sometimes you will find a natural mixture that will give the required result. A fire brick clay must have the power to resist high temperature, a high physical strength, a loose, porous texture to permit of rapid absorption and radiation of heat, and a small amount of shrinkage. The best fire brick clays in West Tennessee come from clay lenses which occur in the lower part of the LaGrange formation, along its eastern outcrop, in Henry, Carroll, Madison, and Hardeman Counties. Plants are located at Puryear, Henry County, and at Gilmore, Madison County. There are many other places where deposits were seen in the LaGrange, as well as in the Ripley formations, which could be utilized to make good fire brick.

Such a clay should not fuse under cone 27, while the best fire clays fuse at cone 35. Of the seven samples which were sent to Heinrich Ries, of Cornell School of Ceramics (p. 30), six of them fused at cone 27 or over. The highest point reached was cone 30 in two samples, one from near Cottage Grove, the other from a road exposure 3 miles north of Milan. The former very fine-grained, and has a total shrinkage of 5 per cent and a good bonding power, while the latter is coarser grained, has no shrinkage and bonding power, which does not seem strong.

According to the conditions under which a fire brick is to be used, they must have different properties. For abrasive resistance they must be hard; for corrosion, dense; while to resist high heats and changes of temperature, porosity and coarseness are important.

The above facts with reference to clay in Tennessee were taken from "Clay Deposits of West Tennessee" and Introduction to "Tests on the Clays of Henry County," by Wilbur A. Nelson, Assistant State Geologist of Tennessee.

CLAY.

Clay mined and sold in 1911 in Tennessee (short tons).

COUNTY	Total Number of Employes	Character of Clay Mined and Sold							Total
		Ball Clay	Fire Clay	Kaolin	Saggar Clay	Slip Clay	Stoneware Clay	Wad Clay	
Henry	155	29,453	.....	.....	4,640	411	.....	12,883	47,387
James	4	.....	468	.....	.....	.....	.....	.....	468
Knox	3	.....	.....	344	.....	.....	.....	.....	344
Madison	5	.....	300	.....	.....	.....	.....	.....	300
Putnam	4	.....	.....	1	.....	.....	320	.....	321
Rhea	4	.....	1,403	.....	.....	.....	.....	.....	1,403
Weakley	1	.....	6	.....	.....	.....	.....	.....	6
Total	176	29,453	2,177	345	4,640	411	320	12,883	50,229

RECAPITULATION.

Total number of employes	176
Average wages paid per day	$ 1.34
Total amount paid for labor	$60,669.00

PRODUCT AND VALUES.

Character of Clay	Product Short Tons	Value
Ball Clay	29,453	$ 73,360
Fire Clay	2,177	4,507
Kaolin	345	438
Saggar Clay	4,640	8,050
Slip Clay	411	617
Stoneware Clay	320	380
Wad Clay	12,883	18,046
Total	50,229	$ 105,398

The clay given above is only such as is mined and sold as clay by the miner, and does not embrace the clay turned into brick, tiling, or pottery by the parties mining it, except as to stoneware values which are eliminated under head of brief statistics.

Of the above quantity 2,216 tons, valued at $3,735, were sold to and used by Tennessee manufacturers.

The following table, taken from the U. S. Geological report, gives clay mined and sold in the United States in 1910 by States in short tons. Any discrepancies between this and previous State reports can be accounted for by different method of classifications.

Clay mined and sold in the United States in 1910, *by States, in short tons.*

STATE	Kaolin		Paper Clay		Slip Clay		Ball Clay		Fire Clay		Stoneware Clay		Brick Clay		Miscellaneous Clay (a)		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Alabama									54,482	$ 32,395			(b)	(b)	17,600	$ 3,700	75,082	$ 36,045
Arizona (c)	(b)	(b)							642	4,030	(b)	(b)	(b)	(b)	805	805	15,595	124,035
California									39,104	63,829	8,341	$ 5,925	(b)	(b)	14,880	21,234	70,465	104,163
Colorado									29,410	31,467			61,402	$ 40,883	15,062	11,505	105,874	83,855
Delaware	(b)	(b)							(b)	(b)							11,117	60,744
Florida							27,400	$ 134,512	(b)	(b)							27,403	134,542
Georgia			36,571	$184,529					7,821	6,031	2,879	8,656			19,021	24,569	66,292	223,785
Illinois									82,878	111,078	42,410	34,202	13,704	16,344	49,811	29,272	188,803	190,896
Indiana					(b)	(b)			77,525	69,184	3,232	4,025	(b)	(b)	3,799	4,450	88,176	80,829
Iowa									(b)	(b)			(b)	(b)	700	210	12,640	5,153
Kentucky					(b)	(b)	(b)	(b)	60,342	45,962	(b)	(b)	728	401	(b)	(b)	80,420	85,555
Maryland	(b)	(b)							17,490	31,024	2,100	2,650	1,150	1,125	256	344	22,696	46,143
Massachusetts									931	1,911	(b)	(b)	(b)	(b)			1,922	2,985
Michigan					1,363	$ 3,889							(b)	(b)	(b)	(b)	1,424	4,394
Missouri	(b)	(b)							282,834	488,365	1,246	1,294	(b)	(b)	439	466	287,445	509,433
Montana									7,011	10,069							7,011	10,069
New Jersey							(b)	(b)	286,854	468,890	21,099	45,171	30,645	28,683	64,097	97,685	405,591	657,805
New Mexico									14,235	30,727							14,235	30,727
New York					(b)	(b)			(b)	(b)					1,424	1,561	5,880	13,241
Ohio					(b)	(b)			231,568	172,162	57,087	39,307	(b)	(b)	4,700	5,257	325,308	228,255
Pennsylvania	4,303	$ 23,411	20,327	117,021					345,388	478,619	9,066	5,760	6,499	5,025	10,655	6,777	396,238	636,613
South Carolina			29,051	118,926					(b)	(b)					210	181	29,920	122,567
Tennessee							32,344	82,994	17,122	24,454	4,913	5,578			7,028	7,727	61,407	120,753
Texas									1,114	5,786							1,114	5,786
Utah									6,209	8,903							6,209	8,903
Vermont	5,900	33,200							(b)	(b)					(b)	(b)	6,060	34,038
Virginia									499	1,475					31	11	530	1,486
Washington									3,451	5,932					400	1,200	3,851	7,132
West Virginia									65,335	47,623			(b)	(b)	3,695	3,620	69,030	51,243
Wisconsin											(b)	(b)	(b)	(b)	50	100	359	518
Wyoming															532	1,392	532	1,392
Other States (d)	24,018	199,262			16,333	26,073	10,893	39,759	6,686	17,804	569	476	59,497	35,578	38	1,040	(e)	(e)
Total	34,221	$ 255,873	85,949	$ 420,476	17,696	$ 29,962	70,637	$ 257,265	1,638,931	$ 2,157,720	152,942	$ 158,044	173,625	$ 128,039	215,228	$ 223,106	2,389,229	$ 3,625,485

(a) Including bentonite, modeling clay, pipe clay, terra cotta clay, and clay for medicinal use. (b) Included in "Other States." (c) Including Connecticut, Idaho, Minnesota, Mississippi, North Carolina, North Dakota, and Oregon. (d) Includes all products which could not be published separately without disclosing individual figures. (e) The total of "Other States", is distributed among the States to which it belongs, in order that they may be fully represented in the totals.

CLAY PRODUCTS—BRICK, SEWER PIPE, TILING, ETC.

This table gives the number of employes engaged in clay product industries and the total value of the products in Tennessee for 1911.

Brick, tiling, sewer pipe, and kindred products in Tennessee in 1911.

COUNTY	Total Number of Employes	Quantity (Thousands)					Total Values of Brick	Value of Drain Tile	Value of Sewer Pipe	Value of Hollow Building Tile, Blocks and Fire-proofing	Total Value of all Brick, Drain Tile, Etc.
		Common Brick	Vitrified Paving Brick	Front Brick	Fancy or Ornamental Brick	Fire Brick					
Blount	35	3,410		7			$ 19,650				$ 19,650
Carroll	44	1,350					6,900				6,900
Carter	50	500					3,000				3,000
Coffee	20	350					2,400				2,400
Davidson	277	27,907		6,942	10		216,319				216,319
DeKalb	8	75					525		$ 30		555
Dyer	38	3,650					25,566				25,566
Gibson	55	2,200					14,290				14,290
Greene	38	321					1,968	$ 8,531			10,499
Hamblen	22	450					3,100			$ 2,100	5,200
Hamilton	375	30,148		500		400	156,041	20,000	85,000	20,000	281,041
Hardeman	20	1,000					6,500				6,500
Haywood	15	800					5,600				5,600
Henderson	6	300					2,400				2,400
Henry	18	500					3,500				3,500
Jefferson	7	300					2,100				2,100
Knox	115	14,165		1,266			94,308				94,308
Lawrence	15	1,250					7,350				7,350
Madison	84	2,595				907	28,658				28,658
Marshall	7	400					2,400				2,400
Maury	26	902					5,407				5,407
Montgomery	25	1,500					9,000				9,000
Morgan	30			350			5,250				5,250
Obion	79	1,850					12,950	24,109			37,059
Putnam	6	100					900				900
Robertson	10	550					3,850				3,850
Rutherford	24	700					4,200	5,000			9,200
Scott	118		7,330				76,230				76,230
Shelby	114	30,426					206,594				206,594
Sullivan	88	6,997	5				40,028	409		265	40,702
Sumner	12	280					1,600				1,600
Tipton	17	600					4,800				4,800
Warren	10	125					1,000				1,000
Weakley	20	2,000					11,000				11,000
White	12	650					6,500				6,500
Total	1,840	138,351	7,335	9,065	10	1,307					
Total Values		809,158	$ 76,356	$ 90,205	$ 250	$ 15,915	$ 991,884	$ 58,049	$ 85,030	$ 22,365	$ 1,157,328
Value per 1,000		$ 5.85	$ 10.41	$ 9.95	$ 25.00	$ 12.18					

RECAPITULATION.

Total average number of employes	1,840
Average wages paid per day	$ 1.43
Total amount paid for labor	$478,367.00

POTTERY

This table gives the average number of employes engaged in the pottery business in Tennessee for 1911, together with the value of all pottery products.

Employes and classified value of pottery products in Tennessee in 1911.

COUNTY	Total Average No. of Employes	Red Earthenware	Stoneware	Turpentine Cups	Total Value	Total Kilns in Use
Carroll	4	$ 200	$ 2,400		$ 2,600	
Davidson	40		37,457		37,457	
DeKalb	4	30	300		330	
Hamilton	200			$ 220,942	220,942	
Madison	8	50	1,750		1,800	
Putnam	2		300		300	
Total	258	$ 280	$ 42,207	$ 220,942	$ 263,429	34

RECAPITULATION.

Total average number of employes	258
Average wages paid per day	$ 1.43
Total amount paid for labor	$104,481.00

COKE

Coke, as here considered, is the product obtained by subjecting certain grades of bituminous coal to high temperatures in chambers from which either the air is entirely excluded or into which only a sufficient quantity of air is admitted to secure supposedly the combustion of volatile contents of the coal. The process is one either of distillation or of partial combustion. The coke-making practice in the United States has been that of partial combustion in ovens having the shape of the conventional beehive. In this type of oven no attempt is made to recover any of the constituents of the coal, except the fixed carbon or coke. The whole coke output in Tennessee is manufactured in these beehive ovens. While noteworthy progress has been made in the United States in the substitution of modern retort ovens for the old wasteful beehive type, still this country is far behind European countries in this particular.

The fact that the larger per cent of coke made in Tennessee is made at the mines from which the coal is taken and is used by blast furnaces at these points; that at these points there would be little market for the gas, one of the principal by-products; and that the plants necessary for the by-product ovens would necessitate a large outlay in first cost, explains largely why these ovens have never been used in this State. It will not probably be many years, however, before such plants will be erected in Tennessee.

Most of the coke made in Tennessee is used in blast furnaces. These require a high-grade coke, low in ash and also very hard in structure, so as to sustain the burden without crushing. While many of the seams of this State are coking coals, there are several which make a high-grade blast furnace coke, comparing very favorably with the Virginia coals.

COKE.

In order to make the best coke, the coal should be crushed and washed, washing greatly reducing the per cent of ash, which is especially necessary in blast furnace use.

Formally a part of the coke was made from unwashed coal, but the present year shows all coal used as washed. While a number of the mines coke only the slack and smaller sizes, there are several in which their whole output is disposed of in this manner.

The following table shows operators of coke plants, arranged alphabetically by counties; also name of coke works in Tennessee in 1911:

Coke manufacturers and coke works in Tennessee in 1911.

	COKE MANUFACTURERS		COKE WORKS	
No.	County and Name	Post Office	County and Name	Post Office
	CAMPBELL COUNTY		CAMPBELL COUNTY	
1	LaFollette Iron Co.	LaFollette	LaFollette	LaFollette
	CLAIBORNE COUNTY		CLAIBORNE COUNTY	
2	Mingo Coal and Coke Co.	Hartranft	a Mingo	Hartranft
	CUMBERLAND COUNTY		CUMBERLAND COUNTY	
3	Waldensia Coal and Coke Co.	Waldensia	a Waldensia	Waldensia
	GRUNDY COUNTY		GRUNDY COUNTY	
4	Sewanee Fuel and Iron Co.	Coalmont	Coalmont	Coalmont
5	Tenn. Consolidated Coal Co.	Tracy City	a Bryant Ridge	Tracy City
	HAMILTON COUNTY		HAMILTON COUNTY	
6	Durham Coal and Iron Co.	Chattanooga	Soddy	Soddy
	MARION COUNTY		MARION COUNTY	
7	New Etna Coal Co.	Whiteside	a Etna	Whiteside
8	Tenn. Coal, I. & R.R. Co.	Birmingham, Ala.	a Victoria	Victoria
9	Tenn. Coal, I. & R.R. Co.	Birmingham, Ala.	a Whitwell	Whitwell
	MORGAN COUNTY		MORGAN COUNTY	
10	State of Tennessee	Nashville	Brushy Mountain	Petros
	RHEA COUNTY		RHEA COUNTY	
11	Dayton Coal and Iron Co.	Dayton	a Nelson	Dayton
12	Dayton Coal and Iron Co.	Dayton	Richland	Dayton
13	Durham Coal and Iron Co.	Chattanooga	Fox	Graysville
	ROANE COUNTY		ROANE COUNTY	
14	Roane Iron Co.	Rockwood	Roane Iron	Rockwood
	SEQUATCHIE COUNTY		SEQUATCHIE COUNTY	
15	Southern Iron and Steel Co.	Birmingham, Ala.	a Southern	Dunlap
	WHITE COUNTY		WHITE COUNTY	
16	Bon Air Coal and Iron Co	Nashville	a Eastland	Eastland

a—Not active.

COKE WORKS IN TENNESSEE.

The following table gives the number of coke ovens now built, the number in operation in 1911, and the value of coke works in Tennessee at the present time:

Coke Ovens and Coke Works in Tennessee in 1911.

COUNTY	Number of Establishments	Ovens			Value of Works		
		Built	Building	In Blast During Year	Plant	Machinery and Improvements	Total
Campbell	1	293	------	250	$ 165,000	$ 40,000	$ 205,000
Claiborne	1	173	------	------	25,000	3,000	28,000
Cumberland	1	60	------	------	10,000	5,000	15,000
Grundy	2	380	30	13	68,000	9,100	77,100
Hamilton	1	206	------	100	50,000	50,000	100,000
Marion	3	445	------	------	46,500	4,114	50,614
Morgan	1	140	------	140	27,543	7,000	34,543
Rhea	3	449	------	225	80,875	27,000	107,875
Roane	1	370	------	240	70,000	10,000	80,000
Sequatchie	1	168	------	------	15,000	5,000	20,000
White	1	200	------	------	120,000	5,000	125,000
Total	16	2,884	30	968	$ 677,918	$ 165,214	$ 843,132

NOTE.—All ovens are of the bee-hive type.

EMPLOYES AND WAGES PAID IN COKE WORKS.

The following table gives the number of employes, average and total wages paid, and amount of coal coked in Tennessee by coke works in 1911:

Employes and wages and character of coal coked in Tennessee in 1911.

COUNTY	Employes			Character of Coal Coked (Short Tons)				
	Total Number	Average Wages Paid Per Day	Total Amount Paid for Labor	Run of Mine		Slack		Total
				Unwashed	Washed	Unwashed	Washed	
Campbell	86	------	----------	----------	----------	----------	200,031	200,031
Claiborne	------	------	----------	----------	----------	----------	----------	----------
Cumberland	------	------	----------	----------	----------	----------	----------	----------
Grundy	13	------	----------	----------	----------	----------	17,223	17,223
Hamilton	40	------	----------	----------	----------	----------	61,084	61,084
Marion	------	------	----------	----------	----------	----------	----------	----------
Morgan	60	------	----------	----------	----------	----------	91,106	91,106
Rhea	85	------	----------	----------	----------	----------	136,725	136,725
Roane	80	------	----------	----------	164,798	----------	----------	164,798
Sequatchie	------	------	----------	----------	----------	----------	----------	----------
White	------	------	----------	----------	----------	----------	----------	----------
Total	364	$1.35	$123,714	----------	164,798	----------	506,169	670,967

QUANTITY OF COAL COKED.

This table shows the quantity of coal consumed in the production of coke, the percentage yield of coal in coke, and the value of the coke produced by the coke works of Tennessee in 1911.

Coal coked, yield of coal in coke and quantity and value of coke produced in Tennessee in 1911.

COUNTY	Coal Used (Short Tons)	Yield of Coal in Coke (Per Cent)	Coke Product		
			Quantity (Short Ton)	Value	Value Per Ton
Campbell	200,031	47.39	94,794	$ 165,890	$ 1.75
Claiborne					
Cumberland					
Grundy	17,223	50.07	8,623	23,713	2.75
Hamilton	61,084	50.04	30,569	67,250	2.20
Marion					
Morgan	91,106	50.00	45,553	75,162	1.65
Rhea	136,725	52.17	71,336	227,891	3.29
Roane	164,798	50.00	82,399	242,039	2.94
Sequatchie					
White					
Total	670,967	49.67	333,274	$ 801,945	$ 2.41

QUANTITY AND VALUE OF COAL COKED.

This table gives the quantity and value of the coal used in the manufacture of coke, and the quantity and value of coal used per ton of coke in Tennessee for the year 1911.

Quantity and value of coal used, and quantity and value of coal per ton of coke in 1911.

COUNTY	Coal Used (Short Tons)	Total Value of Coal Used	Value of Coal per Ton	Quantity of Coal per Ton of Coke	Value of Coal in a Ton of Coke
Campbell	200,031	$ 100,015	$ 0.50	2.11	$ 1.05
Claiborne					
Cumberland					
Grundy	17,223	15,500	.90	2.00	1.80
Hamilton	61,084	45,813	0.75	2.00	1.50
Marion					
Morgan	91,106	54,664	0.60	2.00	1.20
Rhea	136,725	184.567	1.35	1.92	2.59
Roane	164,798	196,147	1.19	2.00	2.38
Sequatchie					
White					
Total	670,967	$ 596,706	$ 0.89	2.01	$ 1.79

QUANTITY AND VALUE OF COAL USED IN COKE MANUFACTURE.

Excluding the operations of the State at Brushy Mountain mines, in Morgan County, the quantity and value of coal used in coke manufacture are as follows:

Total coal used in coke manufacture (short tons)	579,861
Total value of coal used in coke manufacture	$542,042
Value per ton of coal used	$ 0.93
Quantity of coal used per ton of coke product (short tons)	2.02
Total value of coal in a ton of coke	$ 1.88

COST OF COKE PRODUCT.

Excluding the operations of the State at Brushy Mountain, which constitute the figures for Morgan County, the cost of coke product manufactured in 1911 is as follows:

	Total Cost.	*Per Cent of Total Cost.*
Coal coked	$542,042	75.71
Labor	123,714	17.28
All other expenses	$ 50,210	7.01
Total cost of coke	$715,966	100.00

ANALYSES.

The latest analyses given by the producing of coke manufactured in Tennessee are as follows:

Coke analyses in Tennessee in 1911.

COUNTY	Name of Works	Analysis (Per Cent) Fixed Carbon	Volatile Matter	Ash	Moisture	Sulphur
Campbell	LaFollette	78.84	6.15	14.01	.....	0.59
Grundy	Coalmont	85.75	0.39	13.44	0.39	0.61
Hamilton	Soddy	81.08	1.07	17.00	0.69	0.45
Morgan	Brushy Mt.	83.90	1.70	14.40	.....	1.89
Rhea	Richland	80.00	2.00	18.00	.....	0.81
Rhea	Fox	78.68	1.84	19.12	0.35	0.60
Roane	Rockwood	83.69	2.58	13.73	.....	0.56

The following table shows the production and other coke statistics in Tennessee for the years 1880, 1890, 1900, 1910, and 1911:

Consolidated statistics of coke manufacture in Tennessee, 1880-1911.

YEAR	Establishments	Ovens		Coal Used (Short Tons)	Coke Produced			Yield of Coal in Coke (Per Cent.)
		Built	Building		Quantity (Short Tons)	Total Value of Coke at Ovens	Value per Ton	
1880	6	656	68	217,656	130,609	$ 316,607	$ 2.42	60.00
1890	11	1,664	292	600,387	348,728	684,116	1.96	58.00
1900	13	1,923	50	946,597	494,438	1,186,655	2.40	52.20
1910	16	2,715	------	756,517	392,647	993,465	2.53	51.90
1911	16	2,884	30	670,967	333,274	801,945	2.41	49.67

This table shows the production and other coke statistics in the United States for the years 1880, 1890, 1900, and from 1901 to 1910, inclusive.

Consolidated statistics of coke manufacture in the United States, 1880-1910.

YEAR	Establishments	Ovens		Coal Used (Short Tns.)	Coke Produced			Yield of Coal in Coke (per Cent)
		Built	Building		Quantity (Short Tons)	Total Value of Coke at Ovens	Value per Ton	
1880	186	12,372	1,159	5,237,741	3,338,300	$ 6,631,267	$ 1.99	63.00
1890	253	37,158	1,547	18,005,209	11,508,021	23,215,302	2.02	64.00
1900	396	58,484	5,804	32,113,553	20,533,348	47,443,331	2.31	63.90
1901	423	63,951	5,205	34,207,965	21,795,883	44,445,923	2.04	63.70
1902	456	69,069	8,758	39,604,007	25,401,730	63,339,167	2.49	64.10
1903	500	79,334	6,175	39,423,525	25,274,281	66,498,664	2.63	64.10
1904	507	83,599	4,430	36,531,608	23,661,106	46,144,941	1.95	64.80
1905	519	87,564	4,751	49,530,677	32,231,129	72,476,196	2.25	65.10
1906	532	93,901	4,519	55,746,374	36,401,217	91,608,034	2.52	65.30
1907	552	99,680	2,546	61,946,109	40,779,564	111,539,126	2.74	65.80
1908	551	101,218	2,241	39,440,837	26,033,518	62,483,983	2.40	66.00
1909	579	103,982	2,950	59,354,937	39,315,065	89,965,483	2.20	66.20
1910	578	104,440	2,567	63,088,327	41,708,810	99,742,701	2.39	66.11

The following tables, taken from the U. S. Geological reports, give the number of coke ovens and the quantity of coke produced in the United States for different periods:

Number of coke ovens in each State or Territory at the close of each year, 1906-1910.

STATE OR TERRITORY	1906	1907	1908	1909	1910
Alabama	9,731	9,889	10,103	10,061	10,132
Colorado	3,419	3,799	3,841	3,846	3,611
Georgia	531	350	350	350	350
Illinois	309	309	430	468	508
Indiana	48	28	46	96	90
Kansas	81	83	67	67	71
Kentucky	462	495	495	494	495
Maryland	200	200	200	200	200
Massachusetts	400	400	400	400	400
Michigan	150	150	150	162	162
Minnesota	50	50	50	50	50
Missouri	6	5	4	4	4
Montana	555	567	551	551	451
New Jersey	150	150	150	150	150
New Mexico	571	896	1,016	1,030	1,030
New York	540	540	540	556	556
Ohio	575	600	481	447	496
Oklahoma (Indian Territory)	490	490	496	536	408
Pennsylvania	47,185	51,364	52,606	54,506	55,656
Tennessee	2,731	2,806	2,792	2,729	2,792
Utah	684	884	864	854	854
Virginia	4,641	5,333	4,853	5,469	5,389
Washington	216	216	251	285	285
West Virginia	19,714	19,688	20,124	20,283	19,912
Wisconsin	388	388	388	388	388
Wyoming	74				
Total	93,901	99,680	101,218	103,982	104,440

Quantity of coke produced in the United States, 1906-1910, by States and Territories, in short tons, with increase and decrease in 1910.

STATE OR TERRITORY	1906	1907	1908	1909	1910	Increase (+) or Decrease (—) in Quantity of Coke Produced	
						1909-10	Per cent
Alabama	3,034,501	3,021,794	2,362,666	3,085,824	3,249,027	+ 163,203	+ 5.3
Colorado (a)	1,455,905	1,421,579	982,291	1,251,805	1,346,211	+ 94,406	+ 7.5
Georgia	70,280	74,934	39,422	46,385	43,814	— 2,571	— 5.5
Illinois	268,693	372,697	362,182	1,276,956	1,514,504	+ 237,548	+ 18.0
Kansas	1,698	6,274	2,497	----------	(b)	(b)	(b)
Kentucky	74,064	(b)	(b)	46,371	53,857	+ 7,486	+ 16.1
Montana	38,182	(b)	(b)	(b)	(b)	(b)	(b)
New Mexico	147,747	265,125	274,565	373,967	401,646	+ 27,679	+ 7 4
Onio	293,994	270,634	159,578	222,711	282,315	+ 59,604	+ 26.8
Oklahoma (Indian Territory)	49,782	(b)	(b)	----------	(b)	(b)	(b)
Pennsylvania	23,060,511	26,513,214	15,511,634	24,905,525	26,315,607	+ 1,410,082	+ 5.7
Tennessee	483,428	467,499	214,528	261,808	322,756	+ 60,948	+ 23.3
Utah	(c)	(c)	(c)	(c)	(c)	(c)	(c)
Virginia	1,577,659	1,545,280	1,162,051	1,347,478	1,493,655	+ 146,177	+ 10.9
Washington	45,642	52,028	33,889	42,981	59,337	+ 16,356	+ 38.1
West Virginia	3,713,514	4,112,896	2,637,123	3,943,948	3,803,850	— 140,098	— 3.6
Other States	2,085,617	2,655,610	2,286,092	2,509,306	2,822,231	+ 312,925	+ 12.5
Total	36,401,217	40,779,564	26,033,518	39,315,065	41,708,810	+ 2,393,745	+ 6.1

a Colorado includes Utah.
b Included with other States having less than three producers.
c Included with Colorado.

COPPER, GOLD, AND SILVER

The copper deposits in Tennessee are of the Paleozoic era. The type of the ores in this State is the Lenticular deposits in schistose and igneous rocks.

Copper is mined in Tennessee in but one district; this is known as the Ducktown district, in Polk County, in the extreme southeastern portion of the State. The companies operating in this district are the Tennessee Copper Co., with offices and smelters located at Copperhill, and the Ducktown Sulphur and Iron Co. located at Isabella.

This district has been a producer of copper for more than a half century. As early as 1850 copper was produced here, and this section was one of the very earliest of large producers of copper. From 1850 to 1865 the production from black copper ores was very large. But at an early date the rich secondary deposits were exhausted. Efforts were then made to work the low original sulphide, but this did not meet with much success, and in the seventies the smelters were closed. They were opened again in 1890 by the Ducktown Sulphur, Copper and Iron Co., and have been in successful operation from that date down to the present time. The home office of this company is London, England.* The total output of copper from this district down to the close of 1910 has been about 211,700,000 pounds.

*The other company operating in this district is the Tennessee Copper Co., located at Copper Hill. This company is now doing a much larger business than the Ducktown Sulphur, Copper and Iron Co.

COPPER, GOLD, AND SILVER.

The great thickness and extent of the ore bodies, in some instances the veins being more than 100 feet thick, and the large amount of heat generated in the process of smelting by the burning of the abundant supply of sulphur and iron in the ores, together with the value of the sulphuric acid as a by-product, make the development of the low grade ores at a profit possible.

The successful operation of sulphuric acid plants by these companies has not only solved the troublesome smelter smoke problem, but added much to the revenue of the companies.

The Tennessee Copper Co. is operating three mines, the Burra, Burra, the London, and the Polk County. The Ducktown Sulphur, Copper and Iron Co. operates two, the Mary and the East Tennessee mines. These mines are developed by shafts, either vertical or slightly inclined; and the ore is mined by both the overhead or shrinkage system on timbers and the underhand staking system.

GOLD.

All the gold and silver at present reported is the small amount obtained in the reduction of the copper from the Ducktown district. There is, however, gold found in this State in what is known as the Coker Creek district, in Monroe County. While in the early days there was considerable gold taken from this section by the crude methods of placer mining, there are no operations in this locality at present.

SULPHURIC ACID.

In connection with the copper industry in Tennessee, the manufacture of sulphuric acid is a very important factor.[a] Few industries are of greater importance to the South than the manufacture of sulphuric acid. This industry is vitally connected with the manufacture of fertilizers. The cost of fertilizers is very largely determined by the cost of sulphuric acid. The manufacture of fertilizer apart from sulphuric acid is very simple, and the cost is comparatively small. But hitherto it has been necessary for the fertilizer manufacturers to erect sulphuric acid plants in connection with the fertilizer plants proper, and this has entailed enormous outlays since these acid plants are necessarily very costly.

In 1906 work on a large sulphuric acid plant was begun in the Ducktown district. While it was completed in 1907, it was not put into full operation till the following year. Its rated capacity at this time was 120,000 short tons of 60° Baume acid annually. In 1910 an addition was made, which brought the rated capacity up to 180,000 tons yearly, with a probable capacity of over 200,000 tons.

These sulphuric acid p'ants at Ducktown use what was, before their establishment, not only a wholly waste product of the smelters, but also a menace to all the adjacent country. Thus these acid plants have produced at least three desirable results: (1) They furnish a large supply of acid where it is most needed; (2) they render valuable large supplies of sulphur hitherto worthless and, according to the annual report of the Tennessee Copper Co., thus more than double the net profit per ton of ore; and (3) they relieve the surrounding country of the menace of the smelter fumes, thus making it possible to continue operating the mines and at the same time to cultivate the surrounding land.

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a The description of the sulphuric acid business in Tennessee is taken very largely from the paper of Mr. F. B. Laney, who collected data from the Ducktown district in connection with his geologic work. Mr. Laney quotes extensively from Mr. Wilbur A. Nelson.

Total average number of employes	758
Average wages paid per day	$ 2.10
Total amount paid for labor	$ 485,188
Crude ore produced (short tons)	586,514
Value of product (crude ore)	$ 736,329
Value per ton (crude ore)	$ 1.26
Crude ore treated (short tons)	578,174
Refined copper produced (pounds)	18,732,884
Value of product (refined copper)	$ 2,181,662
Average value per pound refined copper (cents)	.11,646
Yield per ton of crude ore in metal (pounds)	32.40
Yield of crude ore in refined copper (per cent)	1.62
Stock on hand beginning of year (pounds)	4,164,559
Stock on hand at end of year (pounds)	4,490,531
Sales, quantity of (pounds)	17,759,506
Sales, amount of	$ 2,082,232

GOLD.

Total product in fine ounces	567
Total value	$ 11,339

SILVER.

Total product in fine ounces	106,660
Total value	$ 57,158

SULPHURIC ACID.

Total product (short tons)	279,878
Total value	$ 1,621,414

The amount of sulphuric acid shown above includes 80,833 short tons, valued at $547,270, which was produced by fertilizer manufacturers of Middle and West Tennessee.

The following table gives copper, gold, and silver product in 1911, compared with 1910:

Production of copper, gold, and silver in 1911, *compared with* 1910.

YEAR	Copper Ore Treated	Metal Content					
		Refined Copper		Gold		Silver	
	Quantity (Short Tons)	Quantity (Pounds)	Value	Quantity (Fine Ounces)	Value	Quantity (Fine Ounces)	Value
1910	552,806	16,837,727	$ 2,081,500	306	$ 6,122	111,588	$ 56,875
1911	578,174	18,732,884	2,181,662	567	11,339	106,660	57,158
Increase (+) or Decrease (−)	+ 25,368	+1,895,157	+$ 100,162	+ 261	+$ 5,217	− 4,928	+$ 283

The following table shows copper operations in Tennessee from 1898, the first year of activity, to 1911, inclusive:

Copper statistics in Tennessee from 1898 to 1911, inclusive.

YEAR	Product and Value			Crude Ore Treated (Short Tons)	Refined Copper and Value			Yield of Crude Ore in Refined Copper (per Cent)	Yield in Pounds of Metal for Each Ton of Crude Ore
	Quantity (Short Tons)	Value Crude Ore	Value per Ton		Quantity (Pounds)	Value	Value per Pound (Cents)		
1898	95,568	$ 205,471	$ 2.15	80,083	3,240,740	$ 356,481	.11	2.01	34.
1899	112,118	285,900	2.55	82,184	3,357,141	559,635	.1667	2.04	30.
1900	118,942	303,302	2.55	97,564	3,454,132	559,223	.1616	1.77	29.04
1901	267,830	669,575	2.50	162,461	5,732,048	908,914	.15857	1.71	21.40
1902	333,239	716,463	2.15	335,864	12,284,515	1,367,421	.11131	1.82	36.86
1903	319,873	719,714	2.25	370,278	13,668,389	1,809,011	.13235	1.84	42.76
1904	287,830	641,860	2.23	384,886	13,905,018	1,721,549	.1239	1.81	48.31
1905	384,192	864,432	2.25	399,330	14,541,425	2,219,938	.1526	1.87	37.85
1906	539,381	1,321,483	2.45	538,141	17,354,781	3,211,966	.185	1.61	32.20
1907	548,171	1,370,200	2.50	557,950	18,892,309	3,652,720	.193	1.72	33.86
1908	643,256	1,362,702	2.12	618,806	19,459,501	2,552,130	.131	1.57	31.45
1909	580,000	713,675	1.23	577,670	19,083,099	2,389,984	.12982	1.65	33.03
1910	534,610	628,538	1.18	552,806	16,837,727	2,081,500	.12738	1.52	30.46
1911	586,514	736,329	1.26	578,174	18,732,884	2,181,662	.11646	1.62	32.40

GAS, GAS COKE, TAR, AND AMMONIA

This table shows number of employes, coal carbonized, total quantity of gas produced in Tennessee in 1911, by counties, and quantity and percentage of gas sold and gas lost or unaccounted for:

Coal carbonized, gas produced, gas sold and gas lost or unaccounted for in 1911.

COUNTY	Total Number of Employes	Coal Carbonized (Short Tons)	Total Gas Production (Cu. Ft.)	Gas Sold		Gas Lost or Unaccounted For	
				Quantity (Cubic Feet)	Percentage	Quantity (Cubic Feet)	Percentage
Davidson	163	b31,598	305,067,700	272,085,200	89.19	32,982,500	10.81
Hamilton	49	15,432	163,374,300	147,839,100	90.49	15,535,200	9.51
Knox	99	b16,054	149,689,000	125,873,800	84.09	23,815,200	15.91
Madison	28	3,478	37,773,169	31,876,600	84.39	5,896,569	15.61
Montgomery	5	1,074	8,904,000	6,945,000	78.00	1,959,000	22.00
Rutherford	2	322	1,783,200	1,783,200	100.00	----------	------
Shelby	28	(a)	390,000,000	335,000,000	85.90	55,000,000	14.10
Sullivan	21	b1,689	15,027,386	9,683,700	64.44	5,343,686	35.56
Total	395	69,647	1,071,618,755	931,086,600	86.89	140,532,155	13.11

a Oil and water gas exclusively. *b* Oil used also.

ILLUMINATING AND FUEL GAS.

This table gives the quantity and value of gas sold in Tennessee for fuel and illuminating purposes and the price paid therefor:

Gas produced and sold for illuminating and fuel purposes in Tennessee in 1911.

COUNTY	Gas Sold for Illuminating Purposes			Gas Sold for Fuel Purposes			Total Gas Sold		
	Quantity Cubic Feet	Value	Pr per 1,000 Cubic Feet	Quantity Cubic Feet	Value	Pr per 1,000 Cubic Feet	Quantity Cubic Feet	Value	Pr per 1,000 Cubic Feet
Davidson	163,251,120	$ 163,251	$ 1.00	108,834,080	$ 108,834	$ 1.00	272,085,200	$ 272,085	$ 1.00
Hamilton	88,703,460	87,532	0.99	59,135,640	58,358	0.99	147,839,100	145,890	.99
Knox	50,349,520	50,449	1.00	75,524,280	75,678	1.00	125,873,800	126,127	1.00
Madison	15,376,600	18,707	1.22	16,500,000	20,100	1.22	31,876,600	38,807	1.22
Montgomery	4,167,000	6,250	1.50	2,778,000	2,850	1.03	6,945,000	9,100	1.31
Rutherford	708,000	1,062	1.50	1,075,200	1,357	1.27	1,783,200	2,419	1.36
Shelby	70,000,000	70,000	1.00	265,000,000	265,000	1.00	335,000,000	335,000	1.00
Sullivan	1,847,600	1,958	1.06	7,836,100	8,267	1.06	9,683,700	10,225	1.06
Total	394,403,300	$ 399,209	$ 1.01	536,683,300	$ 540,444	$ 1.01	931,086,600	$ 939,653	$ 1.01

RECAPITULATION.

Gas, Gas Coke, Tar and Ammonia—continued.

Total average number of employes	395
Average wages paid per day	$ 1.92
Total amount paid for labor	$ 203,606
Total population of all gas districts	399,505
Number of miles of mains	457
Number of gas meters in use	36,047
Number of gas stoves in use	31,637
Oil used (gallons)	1,974,311

CLASSIFIED PRODUCT AND VALUE.

Classified product and value of gas and by-products in 1911.

Kind of Product.	*Quantity.*	*Value.*
By-Products:		
Ammonia liquor (488,758) equivalent to anhydrous ammonia NH_3 (lbs)	190,178	$ 11,749
Coke (short tons)	41,697	130,606
Tar (gallons)	945,168	28,873
Total by-products	.....	$ 171,228
Gas sold (cubic feet)	931,086,600	$ 939,653
Grand total value		$1,110,881

IRON ORE

The localities of the iron ore of Tennessee are found in three belts of the State. These belts differ more or less in geological character and are very distinct. They are as follows:

I. "*The Eastern Iron Region* extends through the State, lies along with and in front of the Unaka range." This includes the counties of Blount, Carter, Cocke, Greene, Hancock, Johnson, McMinn, Monroe, Polk, Sevier, Sullivan, Unicoi, and Washington.

II. *The Middle Region* skirts the eastern base of the Cumberland table land or of Walden's Ridge from Virginia to Georgia; extends out laterly into the valley of East Tennessee from ten to twenty miles; the Sequatchie and Elk Valleys are included. This includes the counties of Anderson, Bledsoe, Campbell, Claiborne, Hamilton, James, Marion, Meigs, Rhea, Roane, Sequatchie, and Union.

III. *The Western Region* occupies a belt of the Highlands contiguous to the western valley and a part of this valley itself; the belt runs through the State from Kentucky to Alabama. This includes the counties of Benton, Davidson, Decatur, Dickson, Hardin, Hickman, Humphries, Lawrence, Lewis, Montgomery, Perry, Stewart, Sumner, and Wayne.

The deposits occur in pockets in the following counties: Claiborne, Cocke, Dickson, Hickman, Johnson, Lawrence, Lewis, Montgomery, Stewart, Unicoi, Washington, and Wayne. In the remaining counties the deposits occur in regular ore seams or veins.

IRON (PIG).

The iron industry in Tennessee shows a considerable decrease in 1911 as compared with 1910. While the reports on the industry in other States for 1911 are not yet out, it is safe to say that the decrease has been general throughout this country. It is probable that the decrease in Tennessee has been no greater relatively than in other States.

While the iron and steel industry broke all previous records in 1910, a decided decrease in production began early in this year, and the decline continued through 1910. In December, 1909, the production in the United States reached 85,000 tons, while the production in the closing month of 1910 amounted to only 57,000 tons. The production for December, 1910, was down almost to that of December, 1908—the year of the general industrial depression. The price of iron in 1911 was lower than it has been since 1905. This, of course, was the determining factor in the decrease in production.

This table gives the average number of employes, the character and value of the product and the explosives in use in iron ore mines in Tennessee for 1911.

Iron ore operations in Tennessee in 1911.

COUNTY	Total Average Number of Employes	Character of Product (Long Tons)			Value of Product		Explosives Used	
		Brown Hematite	Red Hematite	Total	Total Value	Value per Ton	Dynamite (Pounds)	Powder (Kegs)
	1	5	6	7	9	10	11	12
Campbell	23	-------	14,325	14,325	$ 20,217	$ 1.41	-------	-------
Hickman	153	66,003	-------	66,003	95,389	1.45	950	531
Lawrence	153	78,217	-------	78,217	117,266	1.50	1,050	360
Lewis	86	3,175	-------	3,175	4,604	1.45	-------	134
Meigs	55	-------	22,684	22,684	40,565	1.79	10,300	-------
Roane	416	-------	211,702	211,702	247,226	1.17	36,100	7,000
Stewart	25	11,965	-------	11,965	10,769	.90	-------	-------
Wayne	75	59,285	-------	59,285	88,927	1.50	5,350	1,750
Total	996	218,645	248,711	467,356	$ 624,963	$ 1.34	53,750	9,815

RECAPITULATION.

Total average number of employes	996
Average wages paid per day	$ 1.73
Total amount paid for labor	$419,635

PRODUCT AND VALUE OF IRON ORE.

This table gives the product and the value of iron ore produced in Tennessee for 1911, compared with that of 1910, and shows the increases and decreases.

Product and value of iron ore in Tennessee in 1911, *compared with* 1910.

COUNTY	1911		1910		Increase + or Decrease −	
	Product (Long Tons)	Value	Product (Long Tons)	Value	Product (Long Tons)	Value
Campbell	14,325	$ 20,217	26,941	$ 40,411	− 12,616	−$ 20,194
Claiborne	----------	----------	25,583	34,618	− 25,583	− 34,618
Dickson	----------	----------	2,433	3,041	− 2,433	− 3,041
Hickman	66,003	95,389	59,281	84,474	+ 6,722	+ 10,915
Johnson	----------	----------	6,867	13,995	− 6,867	− 13,995
Lawrence	78,217	117,266	221,794	330,623	− 143,577	− 213,357
Lewis	3,175	4,604	30,388	48,954	− 27,213	− 44,350
Meigs	22,684	40,565	18,826	27,440	+ 3,858	+ 13,125
Montgomery	----------	----------	1,922	3,459	− 1,922	− 3,459
Roane	211,702	247,226	198,938	248,066	+ 12,764	− 840
Stewart	11,965	10,769	9,815	9,390	+ 2,150	+ 1,379
Wayne	59,285	88,927	71,905	143,810	− 12,620	− 54,883
Total	467,356	$ 624,963	674,693	$ 988,281	− 207,337	−$ 363,318

IRON ORE.

Product and value of iron ore in Tennessee, 1892 to 1911, inclusive.

YEAR	Product (Long Tons)	Value	Value per Ton	YEAR	Product (Long Tons)	Value	Value per Ton
1892	406,578			1901	620,458		
1893	372,996			1902	628,870	$ 754,644	$ 1.20
1894	292,831			1903	724,264	878,909	1.21
1895	519,796			1904	539,820	613,705	1.14
1896	535,484			1905	730,981	962,427	1.32
1897	604,497			1906	897,059	1,252,553	1.42
1898	617,579			1907	817,767	1,306,727	1.60
1899	667,149			1908	588,988	808,676	1.37
1900	699,724			1909	648,825	935,963	1.44
				1910	674,693	988,281	1.46
				1911	467,356	624,963	1.34

IRON (PIG).

The following table gives names and post office address of all pig iron manufacturers and proprietors of furnaces in Tennessee for the year 1911:

Pig iron manufacturers and furnaces in Tennessee in 1911.

MANUFACTURERS			FURNACE		
No.	County and Name	Post Office	No.	County and Name	Location
	Campbell County			Campbell County	
1	LaFollette Iron Co.	LaFollette	1	LaFollette	LaFollette
	Dickson County			Dickson County	
2	Warner Iron Co.	Cumberland Furnace	2	Cumberland	Cumb. Furnace
	Hamilton County			Hamilton County	
3	Citico Furnace Co.	Chattanooga	3	Citico	Chattanooga
4	Southern Iron and Steel Co.	Birmingham, Ala.	4	a Southern	Chattanooga
	Hickman County			Hickman County	
5	Bon Air Coal and Iron Co.	Nashville	5	a Warner	Warner
6	Napier Iron Works	Nashville	6	a Aetna	Aetna
7	Standard Iron Co.	Nashville	7	Goodrich	Goodrich
	Lewis County			Lewis County	
8	Napier Iron Works	Nashville	8	Napier	Napier
	Marion County			Marion County	
9	Tennessee Coal, Iron and R.R. Co.	Birmingham, Ala.	9	a South Pittsburg 1	South Pittsburg
	Tennessee Coal, Iron and R. R. Co.	Birmingham, Ala.	10	a South Pittsburg 2	South Pittsburg
	Tennessee Coal, Iron and R.R. Co.	Birmingham, Ala.	11	a South Pittsburg 3	South Pittsburg
	Maury County			Maury County	
10	J. J. Gray, Jr.	Rockdale	12	Rockdale	Rockdale
	Montgomery County			Montgomery County	
11	Red River Furnace Co.	Clarksville	13	a Helen	Clarksville
	Rhea County			Rhea County	
12	Dayton Coal and Iron Co.	Dayton	14	Dayton 1	Dayton
	Dayton Coal and Iron Co.	Dayton	15	Dayton 2	Dayton
	Roane County			Roane County	
13	Roane Iron Co.	Rockwood	16	Rockwood 1	Rockwood
	Roane Iron Co.	Rockwood	17	Rockwood 2	Rockwood
	Roane Iron Co.	Rockwood	18	Rockwood 3	Rockwood
	Stewart County			Stewart County	
14	Dover Iron Co.	Carlisle	19	ab Bear Spring	Bear Spring
	Dover Iron Co.	Carlisle	20	b Dover	Carlisle
	Washington County			Washington County	
15	Cranberry Furnace Co.	Johnson City	21	Cranberry	Johnson City
16	Embree Iron Co.	Embreeville	22	a Embree	Embreeville
	Wayne County			Wayne County	
17	Bon Air Coal and Iron Co.	Nashville	23	Monnie 1	Allen's Creek
	Bon Air Coal and Iron Co.	Nashville	24	Monnie 2	Allen's Creek

a Not active. *b* Cold blast, charcoal furnace.

IRON (PIG).

The following table shows average number of employes, average number of days active, quantity of iron ore treated, percentage of yield of ore in iron and quantity of pig iron produced in Tennessee in 1911:

Pig iron employes, ore treated, and pig iron product in Tennessee in 1911.

COUNTY	Average Number of Employes	Average Number of Days Active	Iron Ore Treated (Long Tons)	Pig Iron Produced (Long Tons)	Yield of Ore in Iron (per cent)
Campbell	130	333	135,638	53,327	39.32
Dickson	90	31	3,806	1,723	45.27
Hamilton	105	168	50,600	20,080	39.68
Hickman	56	362	49,263	25,002	50.75
Lewis	86	319	57,946	28,029	48.37
Maury	48	252	11,773	6,820	57.93
Rhea	160	350	153,484	60,712	33.04
Roane	135	355	141,158	56,298	39.88
Stewart	37	276	13,115	3,706	28.26
Washington	85	365	82,423	35,484	43.05
Wayne	80	356	68,584	33,200	48.41
Total	1,012	288	767,790	324,381	42.25

RECAPITULATION.

Total average number of employes	1,012
Average wages paid per day	$ 1.42
Total amount paid for labor	$ 412,226
Total product (long tons)	324,381
Total value of product	$4,033,679
Average value per ton of product	$ 12.44
Stock on hand beginning of year (long tons)	41,669
Stock on hand end of year (long tons)	68,345

MATERIAL USED IN THE MANUFACTURE OF PIG IRON.

Iron ore (long tons)	767,790
Coke (short tons)	534,112
Limestone flux (short tons)	212,751
Mill cinders (long tons)	1,822
Phosphate (long tons)	9,779
Sand (long tons)	2,636
Charcoal (bushels)	560,515
Scrap (long tons)	32

CLASSIFIED PRODUCT AND VALUE OF PIG IRON.

This table shows the classified product and value of pig iron produced in Tennessee in 1911.

Classified product and value of pig iron in Tennessee in 1911.

CHARACTER OF PRODUCT	Amt. of Product (Long Tons)	Value of Product	Value per Ton of Product
Cold Blast	3,706	$ 133,416	$ 36.00
Ferro Phosphorus	6,820	293,260	43.00
No. 1 Soft	24,580	278,868	11.35
No. 2 Soft	46,031	499,859	10.86
No. 1 Foundry	203	2,144	10.56
No. 2 Foundry	74,901	801,474	10.70
No. 3 Foundry	23,956	240,228	10.03
No. 4 Foundry	27,509	275,003	10.00
Gray Forge	6,445	64,790	10.05
Over .05 Sulphur	7,391	77,232	10.45
Under .05 Sulphur	100,875	1,348,783	13.37
Mottled White	1,891	17,608	9.31
Silicon	73	1,014	13.89
Total	324,381	$ 4,033,679	$ 12.44

This table shows the quantity and value of pig iron produced in the United States in 1909 and 1910, by States, in long tons.

Quantity and value of pig iron produced in the United States in 1909 and 1910, by States, in long tons.

STATE	1909		1910		Increase + or Decrease − in 1910		Percentage of Increase + or Decrease − in 1910	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Alabama	1,763,617	$ 22,222,000	1,939,147	$ 23,754,551	+ 175,530	+ $1,532,551	+ 9.95	+ $ 6.90
Illinois	2,467,156	44,211,000	2,675,646	42,917,362	+ 208,490	− 1,293,638	+ 8.45	− 2.93
Kentucky	86,371	1,398,000	100,509	1,692,572	+ 14,138	+ 294,572	+ 16.37	+ 21.07
Maryland	286,856	4,673,000	326,214	5,230,824	+ 39,358	+ 557,824	+ 13.72	+ 11.94
New Jersey	294,474	4,473,000	264,781	4,204,722	− 29,693	− 268,278	− 10.08	− 6.00
New York	1,733,675	27,392,000	1,938,407	32,410,165	+ 204,732	+ 5,018,165	+ 11.81	+ 18.32
Ohio	5,551,545	93,321,000	5,752,112	88,122,356	+ 200,567	− 5,198,644	+ 3.61	− 5.57
Pennsylvania	10,918,824	175,429,000	11,272,323	180,695,338	+ 353,499	+ 5,266,338	+ 3.24	+ 3.00
Tennessee	333,845	4,647,000	397,569	5,271,765	+ 63,724	+ 624,765	+ 19.09	+ 13.44
Virginia	391,134	5,683,000	444,976	6,207,415	+ 53,842	+ 524,415	+ 13.77	+ 9.23
West Virginia	228,282	3,835,000	174,661	2,619,915	− 53,621	− 1,215,085	− 23.49	− 31.68
California, Colorado, Missouri, Oregon, Washington	382,766	7,370,000	428,612	6,514,902	+ 45,846	− 855,098	+ 11.98	− 11.60
Connecticut, Massachusetts	18,388	650,000	16,582	516,363	− 1,806	− 133,637	− 9.82	− 20.56
Georgia, Texas	26,072	442,000	14,725	323,950	− 11,347	− 118,050	− 43.52	− 26.71
Indiana, Michigan	964,289	17,570,000	1,250,103	19,751,627	+ 285,814	+ 2,181,627	+ 29.64	+ 12.42
Minnesota, Wisconsin	343,177	5,859,000	307,200	4,881,408	− 40,977	− 977,592	− 11.77	−16.68
Total	25,795,471	$ 419,175,000	27,303,567	$ 425,115,235	+ 1,508,096	+ $5,940,235	+ 5.85	+ $ 1.42

LIME

The total quantity of lime produced in Tennessee in 1911 was 88,252 short tons. The total value reached the amount of $272,366. This was an increase over the previous year of 3,910 tons in quantity produced and an increase of $14,693 in value of product. Tennessee ranked eighteen as to value of product in lime-producing States in 1909, but moved up to the sixteenth place in 1910. In the year 1910 her rank in lime-producing States, as to quantity of lime produced, was thirteenth, while as to number of operations was eleventh.

This table gives the number of employes engaged and the quantity and value of lime produced in Tennessee in 1911.

Lime product and other statistics in Tennessee in 1911.

COUNTY	Total Number of Employes	Quantity of Lime Burned (Short Tons)	Value of Lime Burned	Value of Lime (per Ton)
Coffee	15	7,670	$ 26,087	$ 3.40
Cumberland	28	7,500	22,500	3.00
Dickson	40	7,500	26,250	3.50
Franklin	45	20,400	61,200	3.00
Greene	5	200	1,000	5.00
Houston	70	13,700	44,000	3.21
Knox	59	19,834	56,635	2.86
Lawrence	3	6	30	5.00
Maury	5	175	1,000	5.71
Rhea	22	6,000	18,000	3.00
Union	28	5,267	15,664	2.97
Total	320	88,252	$ 272,366	$ 3.09

RECAPITULATION.

Total average number of employes	320
Average wages paid per day	$ 1.33
Total amount paid for labor	$101,268
Total quantity of stone burned (short tons)	166,562
Total value of stone burned	75,413
Estimated cost of fuel	$ 66,000

USES OF LIME PRODUCT.

This table gives the production and value of lime produced in Tennessee in 1911.

Lime production in Tennessee in 1911, classified by uses.

USE	Quantity (Short Tons)	Value	Value per Ton
Alkali Works	50	$ 150	$ 3.00
Building	42,003	129,826	3.09
Chemical Works	6,000	18,000	3.00
Dealers (uses not specified)	8,507	27,860	3.27
Fertilizers	86	232	2.70
Hydrated	3,509	14,036	4.00
Paper Mills, Sulphate and Soda Pulp Works	22,760	64,616	2.84
Sugar Factories	3,050	10,650	3.49
Tanneries	785	2,490	3.17
Other Purposes	1,502	4,506	3.00
Total	88,252	$ 272,366	$ 3.09

Fuel used in burning lime.

Coal (short tons)	17,949	Lime Product (short tons)	45,676
Wood (cords)	7,045	Lime Product (short tons)	17,406
Coal (short tons)	5,420	Lime Product (short tons)	25,170
Wood (cords)	5,690		
		Total	88,252

MANGANESE

While Tennessee is one of the few states which has been a producer of manganese ore, little or nothing has been done in this mineral for several years.

The last manganese which was reported to this office was in 1907, when 150 tons were reported from Cocke County. No manganese was reported in 1911.

Manganese in this state occurs principally in Cocke and Johnson counties, with smaller deposits in Carter, Unicoi, Greene, Monroe and Sevier counties. Deposits also have been lately found in Bradley and James counties.

Manganese is used in the United States principally in the manufacture of glass, brick, and for iron alloys. Comparatively little of that used is produced in the United States, the greater part being imported from Brazil, Russia, and British India.

The principal State producing manganese is Virginia, with small amounts reported at various times from Arkansas, California, and Tennessee.

The manganese reported in the United States in 1910 is 2,258 long tons, valued at $22,892, all of which, with the exception of a small amount from Arkansas being credited to Virginia. The average price in the last few years is reported at from $10 to $12 per ton.

MINERAL PAINTS

Mineral paints are produced in three counties in this state, viz., Bradley, James and Wayne. Since 1907 there has been a gradual falling off in the value of metallic paints produced in Tennessee. In 1907, the value of metallic paints produced in this state amounted to $44,200; in 1910, $26,680.

Metallic paint consists chiefly of red and brown iron oxides produced either by grinding natural iron oxides or by roasting natural iron carbonate. The beds of Clinton hematite in New York, Tennessee and Georgia, the Lake Superior red hematite in Northern Michigan, and the gray siderite near Lehigh Gap, Pennsylvania, are the chief sources of the raw ore supply.

The table below shows the quantity and value of the mineral paints produced in Tennessee in 1911.

Production and value of mineral paints in Tennessee in 1911.

COUNTY	Total Average Number of Employes	Metallic Paint		Mortar Colors		Total	
		Quantity (Short Tons)	Value	Quantity (Short Tons)	Value	Quantity (Short Tons)	Value
Bradley	12	750	$ 6,000	------	------	750	$ 6,000
James	12	------	------	600	$ 5,400	600	5,400
Wayne	10	500	6,000	------	------	500	6,000
Total	34	1,250	$ 12,000	600	$ 5,400	1,850	$ 17,400

RECAPITULATION.

Total average number of employes 34
Average wages paid per day .....$ 1.93
Total amount paid for labor $13,400

MINERAL PAINTS.

Production of metallic paint, 1907-1910, by States, in short tons.

STATE	1907		1908		1909		1910	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Maryland	(a)	(a)	(a)	(a)	431	$ 1,957	(a)	(a)
New York	2,159	$ 23,421	2,924	$ 28,090	2,553	25,533	b11,085	$ 32,208
Pennsylvania	6,950	91,900	5,281	69,799	c8,120	105,683	8,063	91,714
Tennessee	d4,056	44,200	d3,645	34,663	4,075	33,369	d3,907	26,680
Other States (e)	1,883	22,172	2,172	24,142	5,543	35,363	6,367	34,267
Total	15,048	$ 181,693	14,022	$ 156,694	20,722	$ 201,905	29,422	$ 184,869

*a*Included in Tennessee.

*b*Principally crude iron ore sold for paint.

*c*Includes a small quantity of venetian red.

*d*Includes Maryland.

*e*Includes, 1907, California, Illinois, Ohio, Wisconsin; 1908, California, Ohio, Vermont, Virginia, Wisconsin; 1909, California, Michigan, Ohio, Vermont, Washington, Wisconsin; 1910, California, Georgia, Michigan, Missouri, Washington, and Wisconsin.

MINERAL WATERS

It is not possible to determine the actual value of the mineral waters consumed because the statistics only show the quantity and value of the waters sold, and do not take into account the large quantities given away at the springs. At many of the springs there are hotels operated by the owners or managers of the springs, and guests at these places are not required to pay for the spring water.

In the United States there was a falling off in the traffic of mineral waters in 1910 as compared with 1909. The total sales in 1909 amounted to 64,674,486 gallons; the sales in 1910 amounted to 62,030,125 gallons. The fall in total values amounted to $536,544. The sales in Tennessee in 1909 amounted to 934,912 gallons, in 1910 the amount reached 950,511 gallons. This was an increase of more than 15,000 gallons, but there was a falling off in the total value in 1910 of $5,056.

MINERAL WATERS.

This table gives the quantity and value of mineral waters sold in Tennessee in 1911.

Production and value of mineral waters in Tennessee in 1911.

COUNTY	No. of Springs Reporting Sales	Quantity Sold (Gallons)	Average Retail Price per Gallon at Spring	Value of Water Sold		
				Medicinal Purposes	Table Purposes	Total
Cheatham	2	5,600	$ .10	$ 445	$ 115	$ 560
Davidson	6	645,717	.066	19,995	22,401	42,396
Franklin	1	384	.50	192	.....	192
Grainger	3	163,835	.148	21,907	2,415	24,322
Hawkins	2	36,650	.124	4,550	.....	4,550
Knox	1	40,000	.08	3,200	.....	3,200
Macon	2	5,600	.252	1,414	.....	1,414
Montgomery	1	670	.049	33	.....	33
Rhea	1	9,000	.03	270	.....	270
Unicoi	1	360	.083	30	.....	30
Wilson	2	108,640	.096	10,432	.....	10,432
Total	22	1,016,456	.086	$ 62,468	$ 24,931	$ 87,399

Name and location of mineral springs in Tennessee.

COUNTY	Name of Spring	Location of Spring	Post Office
Blount	Montvale	Chilhowie Mountain	Newport
Blount	Mt. Nebo	Chilhowie Mountain	Walland
Cheatham	Bright	Near Ashland City	Ashland City
Cheatham	Willow Brook	Craggie Hope	Craggie Hope
Davidson	Bush Epsom Lithia	Nolensville Road, 8 mi.	Nashville
Davidson	French Lick Sulphur	North Nashville	Nashville
Davidson	Larkin	Madison	Nashville
Davidson	Pioneer Lithia	Near Nashville	Nashville
Davidson	Richardson's Lockland	Nashville, 3 mi.	Nasvhille
Davidson	Thompson's	Nashville, R.F.D. 1	Nashville
Franklin	Eastbrook	Eastbrook	Eastbrook
Grainger	Avondale	Rutledge, 4 mi.	Rutledge
Grainger	Gammon's	Tate Springs, 4 mi.	Tate
Grainger	Heacker	Tate	Tate
Grainger	Lea	Lea Springs	Lea Springs
Grainger	Tate	Tate Springs	Tate Springs
Hawkins	Galbraith	Galbraith Springs	Galbraith Springs
Hawkins	Price's	Klondike, 2½ mi.	Klondike
Hawkins	Kyle's	Near Rogersville	Rogersville
Hawkins	Wright's Epsom Lithia	Mooresburg	Mooresburg
Jefferson	Highland	Joppa, R.F.D.	New Market
Knox	Whittle	Near Knoxville	Whittle Springs
Macon	Epperson	Westmoreland, 2½ mi.	Westmoreland
Macon	Red Boiling	Red Boiling Springs	Red Boiling Springs
Montgomery	Idaho	Near Clarksville	Clarksville
Rhea	Morgan's	Walden's Ridge	Morgan Springs
Rhea	Rhea	Rhea Springs	Rhea Springs
Sumner	Tyree	Hendersonville, 10 mi.	Hendersonville
Unicoi	Unaka	Unaka Springs	Unaka Springs
Warren	Faulkner	McMinnville	McMinnville
Wilson	Hamilton	Horn Springs	Lebanon, R.F.D. 5
Wilson	Horn	Horn Springs	Horn Springs

NATURAL GAS AND PETROLEUM [a]

There was no natural gas or petroleum reported in Tennessee in 1911.

In regard to gas, although small amounts have been found at various times, usually in wells drilled in prospecting for oil, it has never been put to any commercial use with the exception of one or two cases where it has been used locally for private lighting.

Oil—The active prospecting for oil dates back to the close of the civil war when a number of wells were put down. Previous to this time, even as early as 1820 to 1840 oil in considerable quantities is said to have been found in wells sunk by the early settlers in search of brine for making salt; no use was however made of it. Numerous wells have been sunk for oil mostly in Overton, Fentress and Pickett counties at different times. While some of these wells have been barren, many of them had a showing of oil or gas, or produced small quantities of oil. Among those drilled in Overton, Fentress and Pickett counties were several which could be considered as oil producing wells. While in some of these the oil was lost or not utilized on account of difficulties in transportation, various amounts in the different fields have been utilized. It is impossible to estimate the amount of oil which has been produced in this state. If any reports were made to this department, they are not now available. The oil produced in Pickett County and vicinity which was transported through the Cumberland Pipe Line Company's pipes, which line was laid about 1896, were reported in connection with Kentucky oil by the United States Geological Survey. This pipe was taken up in 1906 since which time no output has been reported. The amount of oil said to have been piped from Tennessee through this line is 58,776 barrels.

While the field looked very favorable at that time, further investigation has shown that the oil probably came largely from local sources, small in size, and the field now seems to offer no special advantages over other localities along the Highland rim.

While there is no doubt considerable oil in this state, the fact that the porous sandstones, so necessary to act as reservoirs, seem to be of rare occurrence, does not give much encouragement for prospecting. It is by no means impossible however that porous strata may ultimately be found.

(a) Further information on oil and gas may be obtained from a "Preliminary Report on the Oil and Gas Development in Tennessee," by M. J. Munn, United States Geological Survey, published by the Tennessee Geological Survey, also in several bulletins of that department.

PHOSPHATE ROCK

Phosphate deposits are found in the following counties in Tennessee: Giles, Hickman, Maury, Williamson, Sumner, Perry, Marshall, and Lewis. They are of three classes—brown residual phosphate, blue bedded phosphate, and white phosphate. The brown phosphate occurs as blanket deposits, and as collar deposits. The principal deposits are in the vicinity of Mount Pleasant, Tennessee. This brown rock carries as much as 80 per cent tricalcium phosphate. The blue phosphate occurs in seams ranging from one to fifty inches in thickness, but the high-grade rock is rarely over twenty-eight inches thick. The phosphate content ranges from thirty to eighty-five per cent tricalcium phosphate.

The principal part of the phosphate mined in this state is the brown rock. This rock occurs as a blanket deposit or bed, with an overburden of earth or clay from

PHOSPHATE ROCK.

5 or 10 to 20 or more feet in thickness. It is mined entirely by surface working. The overburden is first removed by stripping, usually in operations of any size, by steam shovels or excavators, after which the phosphate rock is removed. This rock is of a soft stratified nature and usually mixed with a certain amount of clay or foreign material. The rock is crushed and washed, after which it is thoroughly dried in large rotary dryers. It is then finely ground.

The blue rock occurs as a bedded formation usually between hard slate or limestone strata which form the roof and floor of the mine. While a number of mines have been opened in various parts of the district, there were few that were in continuous operation for much of the time during the past year. This strata or seam of blue rock is of varying thickness, but where mined is usually about two feet. The mines are opened on the outcrop as drift mines, and are worked somewhat similar to the thin seam coal mines, that is on the single or double entry, room and pillar system, the pillars being drawn after the rooms are worked out.

The method of preparing the rock is by a system of crushing, drying, and pulverizing somewhat similar to that of the brown rock, except that no washing is necessary.

PHOSPHATE ROCK.

This table gives the name and the post office address of the operators and superintendents of phosphate plants in Tennessee by counties for 1911.

Phosphate operators and superintendents in Tennessee in 1911.

No.	OPERATOR		SUPERINTENDENTS	
	County and Name	Post Office	County and Name	Post Office
	Giles County		Giles County	
1	American Phosphate Mining Co.	Wales	A. J. Robertson	Wales
2	Charleston S.C.M. & Mfg. Co.	Mt. Pleasant	E. G. Beheler	Wales
3	Consolidated Phosphate Co.	Columbia	John W. Fry	Columbia
4	International Agr. Corporation	115 Brdwy, N. Y.	G. W. Killebrew	Mt. Pleasan
	Hickman County		Hickman County	
5	American Phosphate Mining Co.	New York	A. J. Robertson	Centreville
6	Bear Creek Phosphate M. & M. Co.	Columbia	W. B. White	Columbia, R.R. 9
7	Chickamauga Fertiliser Works	Atlanta, Ga.	J. D. McCarty	Atlanta, Ga.
8	Consolidated Phosphate Co.	Columbia	John W. Fry	Columbia
9	Corn Belt Phosphate Co.	Centreville	F. Hillsman	Centreville
10	International Agr. Corporation	115 Brdway, New York	G. W. Killebrew	Mt. Pleasant
11	Meridian Fertiliser Factory	Meridian, Miss.	A. J. Robertson	Centreville
12	Prescott Phosphate Mining Co.	Boston, Mass.	J. D. C. Bradley	92 State St., Boston
13	Standard Guano & Chem. Mfg. Co.	New Orleans, La.		Centreville
14	Tenn. Cotton Oil Co.	Memphis	J. Myers	Twomey
15	Volunteer State Phosphate Co.	Centreville	S. M. Ward	Centreville
	Lewis County		Lewis County	
16	Charleston S. C. M. & Mfg. Co.	Mt. Pleasant	M. H. Wright	Gordonsburg
17	Consolidated Phosphate Co.	Columbia	John W. Fry	Columbia
18	Dr. S. C. Long	Spring Hill		
	Marshall County		Marshall County	
19	F. H. Gault	Cornersville	F. H. Gault	Cornersville
	Maury County		Maury County	
20	Akin Phosphate Co.	Columbia	R. C. Ewing	Columbia
21	Bear Creek Phos. M. & Mfg. Co.	Columbia	W. B. White	Columbia
22	Brown Rock Phosphate Co.	Mt. Pleasant	D. W. Shofner	Mt. Pleasant
23	Central Phosphate Co.	Mt. Pleasant	M. H. Gray	Mt. Pleasant
24	Century Phosphate Co.	Columbia	A. E. Sheldon	Columbia
25	Charleston S.C.M. & Mfg. Co.	Mt. Pleasant	J W. Burnett	Mt. Pleasant
26	Charleston S. C.M. & Mfg. Co.	Mt. Pleasant	W. D. Carter	Mt. Pleasant
27	Columbia Mining & Mfg. Co.	Columbia		
28	Consolidated Phosphate Co.	Columbia	John W. Fry	Columbia
29	Farmers Ground Rock Phos. Co.	Mt. Pleasant		
30	Globe Phosphate Co.	Columbia	T. Ed. New	Columbia
31	Great Western Phosphate Co.	Mt. Pleasant		
32	Independent Phosphate Co.	Columbia	O. L. Dortch	Columbia
33	International Agr Corporation	115 Brdway, New York	O. L. Dortch	Columbia
34	International Agr. Corporation	115 Brdway, New York	O. L. Dortch	Columbia
35	International Phosphate Co.	Columbia	S. W. Harris	Columbia, R.F.D. 1
36	Jones Phosphate Co.	Mt. Pleasant	E. F. Ligon	Mt. Pleasant
37	Kittrell Bros.	Mt. Pleasant	J W. Kittrell	Mt. Pleasant
38	Dr. S. C. Long	Spring Hill		
39	Mt. Pleasant Bone Phosphate Co.	Mt. Pleasant	A. P. Thweatt	Mt. Pleasant
40	Petrified Bone Mining Co.	Mt. Pleasant	E. F. Ligon	Mt. Pleasant
41	Phosphate Supply Co.	Mt. Pleasant	E. Van Smith	Mt. Pleasant
42	Preston Mining Co.	Columbia	J. H. Morgan	Columbia
43	Tennessee Phosphate Co.	Mt. Pleasant		
44	Williams Phosphate Co.	Mt. Pleasant		
45	W. V. Wilson	Mt. Pleasant	Register	Ridley
	Perry County		Perry County	
46	Perry Phosphate Co.	Nashville	Robin Jones	Steger Bldg., Nash.
	Sumner County		Sumner County	
47	United States Fertiliser Co.	Gallatin	H. C. Stiefel	Gallatin
	Williamson County		Williamson County	
48	F. F. Clawson	Ashwood		
49	International Agr. Corporation	115 Brdway, N.Y.	G. W. Killebrew	Mt. Pleasant

PHOSPHATE VALUES AND CLASSIFIED PRODUCT.

This table gives the number of employes, the wages paid, the total amount paid for labor in phosphate industries in Tennessee in 1911; also the value of the product.

Phosphate employes, and quantity, and value of production in 1911.

COUNTY	Employes			Product (Long Tons)				Value of Product
	Total Average Number	Average Wages Paid per Day	Total Amount Paid for Labor	Blue Rock	Brown Rock	White Rock	Total	
Giles	134	------	----------	--------	19,711	------	19,711	$ 70,302
Hickman	157	------	----------	9,627	8,141	------	17,768	a54,687
Lewis	248	------	----------	64,004	----------	------	64,004	224,014
Maury	1,454	------	----------	--------	439,728	900	440,628	b1,568,674
Sumner	15	------	----------	--------	650	------	650	812
Total	2,008	$ 1.21	$ 719,450	73,631	468,230	900	542,761	$ 1,918,489

(a) Blue Rock values amount to $28,882.

(b) White Rock values amount to $3,600.

Phosphate product and value in Tennessee in 1911 *compared with* 1910.

COUNTY	1911		1910		Increase + or Decrease —	
	Product (LongTons)	Value	Product (LongTons)	Value	Product (LongTons)	Value
Giles	19,711	$ 70,302	18,570	$ 64,995	+ 1,141	+ $ 5,307
Hickman	17,768	54,687	14,583	43,794	+ 3,185	+ 10,893
Lewis	64,004	224,014	54,100	201,875	+ 9,904	+ 22,139
Marshall	----------	----------	20	70	— 20	— 70
Maury	440,628	1,568,674	320,274	917,822	+ 120,354	+ 650,852
Sumner	650	812	----------	----------	+ 650	+ 812
Williamson	----------	----------	2,137	6,413	— 2,137	— 6,413
Total	542,761	$ 1,918,489	409,684	$ 1,234,969	+ 133,077	+ $683,520

The following table gives total product and value of phosphate rock in Tennessee from 1894, the initial year of production, to 1911 inclusive:

Product and values of phosphate rock in Tennessee 1894-1911 *inclusive.*

YEAR	Product (Long Tons)	Value	Value per ton	YEAR	Product (Long Tons)	Value	Value per ton
1894	19,188	$ 67,158	$ 3.50	1903	445,510	$ 1,434,660	$ 2.95
1895	38,515	82,160	2.13	1904	468,443	1,485,665	3.17
1896	26,157	57,370	2.20	1905	505,294	1,580,849	3.13
1897	128,723	193,115	1.50	1906	499,815	1,852,840	3.71
1898	308,107	498,392	1.62	1907	654,641	2,896,169	4.42
1899	462,561	1,272,022	2.75	1908	415,388	1,625,890	3.91
1900	450,856	1,352,568	3.00	1909	348,841	1,135,574	3.25
1901	394,139	1,186,033	3.01	1910	409,684	1,234,969	3.01
1902	454,078	1,341,161	2.95	1911	542,761	1,918,489	3.53
				Total	6,572,701	$ 21,215,084	$ 3.23

PHOSPHATE ROCK—SALES AND DISPOSITION OF PRODUCT.

This table shows the quantity of stock on hand at the beginning and at the close of the year; also the average price received for the domestic and the export product, by counties, for 1911.

Stock on hand, sales, and prices obtained for phosphate rock in Tennessee in 1911.

COUNTY AND KIND OF PRODUCT	Stock on Hand		Sales		
	Beginning of Year (Long Tons)	End of Year (Long Tons)	Quantity (Long Tons)	Amount	Sale Price per Ton
Giles (Brown Rock)	300	4,180	15,831	$ 56,043	$ 3.54
Hickman:					
Blue Rock	7,842	6,042	10,715	32,146	3.00
Brown Rock			8,253	26,181	3.17
Lewis (Blue Rock)	709	1,651	63,062	227,000	3.60
Maury:					
Brown Rock (Domestic)	68,410	62,980	441,183	1,737,448	3.94
Brown Rock (Export)			4,075	18,702	4.59
White Rock (Domestic)			800	3,200	4.00
Sumner (Brown Rock)		650			
Total	77,261	76,103	543,919	$ 2,100,720	$ 3.86

EXPORT COUNTRIES.

The exports of phosphate rock produced in Tennessee in 1911 were confined to the brown rock from Maury County. The reports of operating companies show the number of long tons exported to each country as follows:

	Quantity.	*Value.*
England	1,882	$ 8,305
France	910	4,072
Italy	1,283	6,325
Total	4,075	$18,702

QUARTZ

The quartz used in Tennessee is the massive crystalline form, which is a hard vitreous quartzite of Cambrian age. It usually occurs in veins or dikelike masses, and in some sections much of the surface rock is of this material.

The use of quartz in Tennessee is at present confined to copper smelting in the Ducktown district of Polk County, where it is used as an ingredient in the flux.

The quartz here reported is obtained partly from the quarry of the Tennessee Copper Company, located at Austral, in Polk County; also from surface rock collected in the vicinity of the smelters.

The following table shows the operations in 1911:

Total average number of employes	32
Average wages paid per day	$ 1.75
Total amount paid for labor	$17,881
Total quartz product (short tons)	57,232
Total value	$31,508

SAND AND GRAVEL

The total production of sand and gravel in the United States in 1910 was 69,410,436 tons, valued at $21,037,630, as compared with 59,565,551 short tons, valued at $18,336,990 in 1909, a net increase in quantity of 9,844,885 short tons and in value of $2,700,640 over the production of 1909. In Tennessee the total quantity of sand and gravel produced in 1910 was 521,745 cubic yards, with a total value of $342,794. In 1911 there was an increase in production over 1910 of 108,318 cubic yards and $58,039.

Most of the sand and gravel produced in Tennessee is dredged from the Mississippi and Tennessee Rivers.

"The average value of glass sand in the United States per ton was slightly less than $1.04 in 1910, as compared with $1.05 in 1909. The average value of molding sand per short ton in 1910 was a little less than 70 cents and of fire sand slightly under 77 cents per short ton. The other grades of sand bring much lower prices, the average ranging from about 28 cents per ton in the case of sand for filling stone, screening, etc., to more than 56 cents for furnace sand." (U. S. Geological Survey, p. 601.)

This table gives the product of sand and gravel in Tennessee for 1911; also the value of the product; the classification is by uses in cubic yards of 2,500 pounds.

Sand and gravel product in Tennessee in 1911.

COUNTY	Total Number of Employes	1 Gl. Sand		2 Molding Sand		3 Building Sand		4 Stone Sand		5 Engine Sand		6 Furnace Sand	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Benton	46	----	----	----	----	9,795	$ 4,644	----	----	650	$ 228	1,726	$ 676
Carter	6	----	----	----	----	50,483	32,862	----	----	----	----	----	----
Davidson	44	----	----	1,400	$ 2,250	21,374	8,174	----	----	----	----	----	----
Fayette	18	----	----	2,188	1,248	16,850	15,730	192	$ 300	----	----	----	----
Hamilton	36	----	----	2,300	2,300	19,528	6,203	----	----	1,133	198	----	----
Hardeman	27	360	$ 300	16,000	5,000	133	100	----	----	----	----	----	----
Henry	4	----	----	265	160	----	----	----	----	----	----	500	300
Hickman	2	----	----	----	----	27,000	12,500	5,000	2,500	9,600	3,840	----	----
Knox	29	----	----	1,157	733	300	45	----	----	----	----	----	----
Madison	2	----	----	210	263	8,400	6,720	----	----	----	----	----	----
Marion	15	----	----	----	----	5,222	4,462	----	----	----	----	1,178	512
Roane	8	----	----	----	----	101,372	71,970	----	----	10,959	3,203	----	----
Shelby	70	----	----	----	----								
Total	307	360	$ 300	23,520	$ 11,954	260,457	$ 163,410	5,192	$ 2,800	22,342	$ 7,469	3,404	$ 1,488

SAND AND GRAVEL.

Sand and gravel product in Tennessee in 1911—continued.

COUNTY	7		8						9	
	Other Sand		Roofing		Gravel Concrete		Road Making		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Benton							31,710	$ 14,155	31,710	$ 14,155
Carter									12,171	5,548
Davidson			1,000	$ 500	19,200	$ 10,080			72,083	45,692
Fayette									23,562	9,422
Hamilton					10,000	7,500			29,342	25,830
Hardeman	5,820	$ 1,450							42,841	13,151
Henry							458	400	856	660
Hickman									500	300
Knox									42,757	19,573
Madison									510	308
Marion									8,400	6,720
Roane									6,400	4,974
Shelby			1,379	2,887	145,435	134,348	99,786	42,092	358,931	254,500
Total	5,820	$ 1,450	2,379	$ 3,387	174,635	$ 151,928	131,954	$ 56,647	630,063	$ 400,833

RECAPITULATION.

Total average number of employes	303
Average wages paid per day	$ 1.57
Total amount paid for labor	$95,470

Product and value by uses.

KIND OF PRODUCT	Quantity (Cubic Yards 2500 lbs.)	Total Value	Value per Cubic Yard
BUILDING SAND:			
Concrete	219,565	$ 142,514	$ 0.65
Mortar	40,892	20,896	0.51
Total Building Sand	260,457	$ 163,410	$ 0.63
Glass Sand	360	300	0.83
Molding Sand	23,520	11,954	0.51
Stone Sand	5,192	2,800	0.54
Engine Sand	22,342	7,469	0.33
Furnace Sand	3,404	1,488	0.44
Other Sand	5,820	1,450	0.25
Total Sand	321,095	$ 188,871	$ 0.59
GRAVEL:			
Roofing	2,379	$ 3,387	$ 1.42
Concrete	174,635	151,928	0.87
Road Making	131,954	56,647	0.43
Total Gravel	308,968	$ 211,962	$ 0.69
Grand Total Sand and Gravel	630,063	$ 400,833	$ 0.64

STONE

The total value of all stone produced in Tennessee in 1911 was $1,409,550. The total value for 1910 was $1,490,188.

The limestone here reported does not include the limestone used in the manufacture of Portland Cement, neither that burned into lime.

The following table shows the total product and value of all stone produced in Tennessee for 1911 compared with that of 1910:

Stone product and value in Tennessee in 1911 compared with 1910.

YEAR	Limestone		Marble		Sandstone		Total Value
	Quantity (Short Tons)	Value	Quantity (Cubic Feet)	Value	Quantity (Short Tons)	Value	
1911	1,087,375	$ 555,293	484,095	$ 853,557	450	$ 700	$ 1,409,550
1910	913,556	612,456	464,636	877,432	225	300	1,490,188
Increase + or Decrease −	+ 173,819	− $ 57,163	+ 19,459	− $ 23,875	+ 225	+ $ 400	− $ 80,638

The table below gives the total value of stone produced in Tennessee in 1911, and also the purposes for which the stone was used:

Value of limestone, marble, and sandstone in Tennessee in 1911, and purposes for which it was used.

KIND	Building (Dressed and Rough)	Interior Decorations	Monumental (Dressed and Rough)	Rubble	Riprap	Crushed Stone	Blast Furnace Flux	Other (Dressed and Rough)	Total
Limestone	$ 9,340			$ 3,397	$ 23,722	$ 372,801	$ 79,634	$ 66,399	$ 555,293
Marble	315,446	$ 441,309	$ 27,100					69,702	853,557
Sandstone	700								700
Total	$ 325,486	$ 441,309	$ 27,100	$ 3,397	$ 23,722	$ 372,801	$ 79,634	$ 136,101	$ 1,409,550

STONE USED FOR BUILDING PURPOSES.

This table shows the value of limestone, marble, and standstone produced in 1911, and used for the construction of buildings.

Value of stone produced in Tennessee in 1911 used for building purposes.

KIND	Rough	Dressed	Total
Limestone	$ 6,630	$ 2,710	$ 9,340
Marble	208,602	106,844	315,446
Sandstone	700		700
Total	$ 215,932	$ 109,554	$ 325,486

LIMESTONE.

This table gives the number of employes engaged and the value of the product in limestone production in Tennessee for 1911.

Value of limestone produced in Tennessee in 1911 *by uses.*

COUNTY	Total Average Number of Employes	Crushed Stone					Blast Furnace Flux	Rubble	Riprap	Paving	Curbing	Other	Total Value
		Building (Rough)	Building (Dressed)	Road Making	Railroad Ballast	Concrete							
Campbell	71	------	------	3,377	$ 5,420	$ 1,375	$ 25,845	$ 225	------	------	------	------	$ 36,242
Carter	30	------	------	------	------	------	17,369	------	------	------	$269	------	17,638
Coffee	30	------	------	------	4,721	------	------	------	------	------	------	------	4,721
Davidson	444	$ 1,400	------	115,386	25,166	48,808	------	1,008	$ 23,497	------	------	$ 1,025	216,290
Dickson	15	------	------	------	------	------	807	------	------	------	------	------	807
Franklin	35	------	------	------	16,115	3,678	------	------	------	------	------	------	19,793
Giles	40	------	------	------	8,625	------	------	303	------	------	235	------	9,163
Hamilton	89	2,721	$ 2,710	44,436	14,018	4,931	633	2,086	------	$ 150	336	45	72,066
Hickman	15	------	------	------	------	------	2,025	------	------	------	------	------	2,025
James	10	------	------	------	------	------	1,522	------	------	------	------	------	1,522
Jefferson	50	------	------	46,208	------	------	------	------	------	------	------	------	46,208
Knox	40	625	------	700	1,500	------	------	------	------	2,500	------	700	6,025
Lawrence	3	9	------	------	------	------	------	------	------	------	------	------	9
Marion	39	------	------	------	------	832	------	------	------	------	------	60,615	61,447
Marshall	3	------	------	450	------	------	------	------	------	------	------	------	450
Maury	35	------	------	2,424	------	4,268	11,957	------	------	------	------	236	18,885
Montgomery	15	------	------	2,008	------	------	------	------	------	------	------	------	2,008
Rhea	50	------	------	------	7,000	------	13,804	------	------	------	------	------	20,804
Roane	54	1,875	------	5,625	------	4,125	5,672	------	------	------	------	------	17,297
Ruthe.ford	5	------	------	605	------	------	------	------	------	------	------	------	605
Washington	10	------	------	750	------	250	------	------	------	------	------	288	1,288
Total	1,083	$ 6,630	$ 2,710	$ 221,969	$ 82,565	$ 68,267	$ 79,634	$ 3,397	$ 23,722	$ 2,650	$ 840	$ 62,909	$ 555,293

RECAPITULATION.

Total average number of employes	1,083
Average wages paid per day	$ 1.46
Total amount paid for labor	$297,733

LIMESTONE.

Limestone Product and Value by Uses.

This table gives the total product and the value of the limestone produced in Tennessee in 1911 by uses.

Product and value of limestone in Tennessee in 1911 by uses.

KIND OF PRODUCT	Amount (Short Tons)	Value	Value Per Ton
BUILDING;			
Dressed	272	$ 2,710	$ 9.96
Rough	5,016	6,630	1.32
Total Building	5,288	$ 9,340	$ 1.77
CRUSHED STONE.			
Road Making	267,742	$ 221,969	$ 0.83
Railroad Ballast	189,915	82,565	0.43
Concrete	118,352	68,267	0.58
Total crushed stone	576,009	$ 372,801	$ 0.65
Rubble	3,891	$ 3,397	$ 0.87
Riprap	29,009	23,722	0.82
Blast Furnace Flux	162,758	79,634	0.49
Cement Plants	303,072	60,615	0.20
Agriculture	2,578	2,294	0.89
Total	501,308	$ 169,662	$ 0.34
Curbing	1,970	$ 840	$ 0.43
Paving	2,800	2,650	0.95
Total	4,770	$ 3,490	$ 0.73
Grand total	1,087,375	$ 555,293	$ 0.51

MARBLE.

Distribution of Marble in Tennessee.

a East Tennessee. The marble area as a whole in East Tennessee averages about twenty miles in width, and extends from the Virginia line southwestward to McMinn County, a distance of over 125 miles. The area is traversed throughout its longitudinal extent by the Southern Railway, and transversely by the Louisville and Nashville Railroad. Beds of marbles similar to the Holston marble occur in the Sevier shales of Knox and Sevier counties, and have been worked to some extent. A black marble is found in a number of counties in eastern Tennessee. It is quite compact, sometimes beautifully streaked with white calcite, and takes a fine polish. A green serpentine marble has been reported from Union County. A magnesian marble of impure quality occurs in the Knox dolomite in places; and in Blount, Monroe, and McMinn counties are conglomerates and breccias which, when polished, resemble mosaic work.

Middle and West Tennessee. Red variegated marbles are found in a number of the counties west of the Cumberland tableland, notably on Elk River in Franklin County, and at the Oil Springs on Leiper's Creek in Maury County. Variegated marbles occur also in Western Tennessee in the counties of Henry, Benton, Perry, Decatur, Wayne, and Hardin. A fawn-colored or brownish red marble is found

MARBLE.

on Shoal Creek in Lawrence County. Dove-colored marbles, some of fine quality, are met with in Wilson, Davidson, and Coffee counties, and in Rutherford County is a pale yellow marble with serpentine veins of red and black dots.

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a The facts here used with reference to marbles in Tennessee were taken from "Marbles in Tennessee," by Charles H. Gordon, a publication of the Tennessee Geological Survey.

ANALYSES OF TENNESSEE MARBLE.

	No. 1	*No. 2*
Calcium oxide (CaO)	55.12	55.87
Magnesium oxide (MgO)	0.51	0.15
Carbon dioxide (CO_2)	43.98	43.47
Iron Oxide (FeO, Fe_2O_3)	0.21	0.08
Alumina (Al_2O_2)	....	0.16
Silica (SiO_3)	....	0.23
Insoluble residue	0.07	....
	99.89	99.96

No. 1.—Holston marble taken from a quarry near Knoxville. Analysis made in the laboratory of the Tennessee Experiment Station, University of Tennessee.

No. 2.—Gray marble from the Meadow Quarry. George S. Jamieson, Analyst, Sheffield Scientific School, Yale University.

In 1910, according to the report of the U. S. Geological Survey, Tennessee ranked third among the States of the Union in marble production with reference to value of product. In the value of marble used for interior decoration purposes, Tennessee held second place, Vermont alone producing more marble of this class than Tennessee.

There was an increase in the total number of cubic feet of marble produced in 1911 as compared with 1910; in 1910 the total number of cubic feet being 464,636, and in 1911, 484,095. However, there was a decrease of $13,875 in 1911 as compared with 1910, in the total value of marble produced.

The difference in the value of marble is due largely to the amount of work done on the marble before it is shipped. But the decrease in the quantity and value of marble for decorating purposes reported in 1911, as compared with that reported in 1910, is due, perhaps, to some extent, to a difference in methods of classification in reporting.

MARBLE.

This table gives the number of employes and the value of the marble produced in Tennessee in 1911, by counties.

Value of marble product in Tennessee in 1911, classified by uses.

COUNTY	Total Average Number of Employes	Rough			Dressed				Grand Total
		Building	Monumental	Other Purposes	Building	Monumental	Interior Decorations	Other Purposes	
Blount	163	$ 12,115	-------	-------	$ 5,372	-------	$ 106,443	-------	$ 123,930
Hawkins	25	3,750	-------	-------	-------	-------	1,800	$ 3,600	9,150
Knox	663	148,035	$ 14,600	$ 34,100	88,250	$ 12,500	318,566	21,902	637,353
Loudon	60	44,702	-------	-------	13,222	-------	-------	-------	57,924
Union	54	-------	-------	10,100	-------	-------	14,500	-------	24,600
Total	965	$ 208,602	$ 14,600	$ 44,200	$ 106,844	$ 12,500	$ 441,309	$ 25,502	$ 853,557

RECAPITULATION.

Total average number of employes..... 965
Average wages paid per day.....$ 1.45
Total amount paid for labor.....$319,212

PRODUCT AND VALUE BY USES.

KIND OF PRODUCT	Quantity (Cu. Ft.)	Value	Value per Cu. Ft.	Per cent Tot. Val.
Rough:				
Building	159,816	$ 208,602	$ 1.31	24.44
Monumental	12,800	14,600	1.14	1.71
Other Purposes	41,581	44,200	1.06	5.18
Total Rough	214,197	$ 267,402	$ 1.25	31.33
Dressed:				
Building	54,134	$ 106,844	$ 1.97	12.52
Monumental	2,000	12,500	6.25	1.46
Ornamental	1,000	1,902	1.90	0.22
Interior Decorations	204,326	441,309	2.16	51.70
Other Purposes	a8,438	23,600	2.80	2.77
Total Dressed	269,898	$ 586,155	$ 2.17	68.67
Grand Total	484,095	$ 853,557	$ 1.76	100.00

a 438 cubic feet or 3,500 square feet used for decorating furniture.

The value of marble product in Tennessee from 1898 to 1911 inclusive is as follows:

Year	Value	Year	Value	Year	Value
1898	$ 216,841	1902	$ 518,256	1906	$ 576,259
1899	334,705	1903	438,450	1907	699,041
1900	424,054	1904	523,872	1908	761,222
1901	494,637	1905	536,729	1909	590,585
				1910	877,432
				1911	853,557

SANDSTONE.

The table below gives the value of sandstone produced in Tennessee in 1911, the number of employes engaged, and the uses by counties:

Value of sandstone product in Tennessee in 1911 by counties and uses.

COUNTY	Total Average No. of Employe	Rough Building	Total
Franklin	4	$ 700	$ 700
Total	4	$ 700	$ 700

RECAPITULATION.

Total average number of employes..... 4
Average wages paid per day.....$1.62
Total amount paid for labor.....$300

PRODUCT AND VALUE BY USES.

KIND	Quantity (short tons)	Value	Value per Ton
BUILDING:			
Dressed			
Rough	450	$ 700	$ 1.55
Total	450	$ 700	$ 1.55

ZINC AND LEAD

Zinc is the metal which is principally considered under this head. While lead is found in a number of localities in Tennessee, and in former years was mined to a greater or less extent, as is shown in the last table on this subject. No reports of the production of lead have been made since 1907, when a small quantity was reported from Bradley and Claiborne counties.

ZINC.

The zinc mines and prospects in Tennessee lie north and northeast of Knoxville, and are included within a northeast, southwest area, forty miles wide and eighty miles in length. They include what will be known as the Holston River group, located in the valley of Holston River in Knox and Jefferson counties; the Powell River group, located near the river by this name, in Union and Claiborne counties; the Straight Creek group, located on Straight Creek, Claiborne County; the Fall Branch group, in Sullivan County; and the Jearoldstown group, in Greene County. Besides these there is a prospect three miles east of White Plains in Jefferson County, known as the Felknor mine.*

Considering the large extent and probable size of the ore bodies, the proposition in the Tennessee zinc field must be considered more from the aspect of a manufacturing proposition—that is, the development depends largely on the successful concentrating and treating of large quantities of more or less low-grade material. With

*"Zinc Deposits of Northern Tennessee," by A. H. Purdue.

modern facilities and increased knowledge in this line, however, we can hope for greatly increased development of zinc in this State.

Aside from a considerable amount of prospecting which is being done, the principal mining at present consists of the mines of the Grasselli Chemical Company, at New Market, and the American Zinc Company of Tennessee, at Mascot. The Grasselli Chemical Company are operating in what is known as the "carbonites" (Smithsonite ore). This ore is found in the clay formation above the Knox dolomite. The ore is found in pockets, on and around the large irregular masses of dolomite called pinnacles, and under a clay overburden of 40 to 60 feet. In the deeper deposits the mining is done by sinking shafts through the clay and taking out the ore by a system of tunnelling and stopeing, following the ore deposits between and around the pinnacles, the overburden being in all cases supported by timbering. The greater part of the mining is, however, being done by open cut work, the clay overburden being completely removed by steam shovels and excavators, after which the ore-bearing material is removed by hand. The ore is found in and mixed with the clay, usually just above the dolomite.

This material is treated at the company's mill at the mine by a system of log washers, jigs, and concentrating tables, the product being a high-grade concentrate, which is shipped to the smelter, there being at the present time no smelting done in this State.

The operations of the American Zinc Company of Tennessee, at Mascot, are as yet in the process of development. This company has sunk a shaft into the ore body near the old shaft of the Holston Zinc Company, and are now developing the same. The ore is sphalerite, generally spoken of as sulphides. The ore body is in the brecciated dolomite and limestone formation of the Knox dolomite. A mill has been projected, and the ore will be treated by a system of pulverizing and concentrating in large quantities. This ore will be mined by one of the systems applicable to large ore bodies in hard rock, little or no timbering being required.

Although there is considerable variation in the Tennessee ores, the following assays, taken from "Bulletin 14, The Zinc Deposits of Northeastern Tennessee," by A. H. Purdue, State Geologist, will show the general characteristics of the two principal ores:

Sphalerite—From the American Zinc Company's Mine, Mascot.

Moisture	.06	per cent
Metallic zinc	62.00	per cent
Iron	.26	per cent
Insoluble residue	4.64	per cent
Sulphur	30.46	per cent
Manganese	.007	per cent
Copper	Trace	
Lead	Trace	

Smithsonite—From the Grasselli Chemical Company's Mine, New Market.

Moisture	.32	per cent
Zinc	45.03	per cent
Iron	.33	per cent
Insoluble residue	10.60	per cent
Calcium carbonate	.50	per cent
Manganese	.022	per cent
Magnesium carbonate	Trace	
Copper	Trace	
Lead	Trace	
Equivalent to zinc carbonate	86.25	per cent

ZINC AND LEAD.

The following table gives lead and zinc operations in Tennessee in 1911 by counties:

Zinc and lead operations in Tennessee in 1911.

COUNTY	Average Number of Employes	Ores: Lead Concentrates—Carbonate: Quantity (Short Tons)	Ores: Lead Concentrates—Carbonate: Value	Ores: Zinc Concentrates Blende and Carbonate: Quantity (Short Tons)	Ores: Zinc Concentrates Blende and Carbonate: Value	Metal Content: Lead: Quantity (Pounds)	Metal Content: Lead: Value	Metal Content: Zinc: Quantity (Pounds)	Metal Content: Zinc: Value
Jefferson	115			3,175	$ 64,296			2,234,000	$ 120,600
Total	115			3,175	$ 64,296			2,234,000	$ 120,600

RECAPITULATION.

Total average number of employees	115
Average wages paid per day	$ 1.50
Total amount paid for labor	$43,584

Zinc and lead product and value in Tennessee, 1902-1911.

YEAR	Ores: Lead Concentrates Carbonate: Quantity (Short Tons)	Ores: Lead Concentrates Carbonate: Value	Ores: Zinc Concentrates Blende-Carbonate: Quantity (Short Tons)	Ores: Zinc Concentrates Blende-Carbonate: Value	Metal Content: Lead: Quantity (Pounds)	Metal Content: Lead: Value	Metal Content: Zinc Blende & Carbonate: (Quantity (Pounds)	Metal Content: Zinc Blende & Carbonate: Value
1902	225		420		40,000	$ 2,000	26,000	$ 1,620
1903	610		1,700		115,500	5,760	104,500	6,120
1904	780		300		147,500	7,200	18,500	1,200
1905	1,120		774		213,400	10,670	48,000	2,870
1906	415		200		78,500	3,750	12,500	754
1907	85		1,118		15,700	785	251,198	14,821
1908			1,554				371,677	26,574
1909			2,022	$ 48,236			1,573,076	115,960
1910			2,899	69,959			2,132,082	115,132
1911			3,175	64,296			2,234,000	120,600